SOUTHERN POWER AND INDUSTRY

FEBRUARY, 1955

LIGNITE
WOOD WASTE
BAGASSE

Utilizing a gas-turbine power plant for the dual purpose of predrying high moisture-content fuel and as a combustion topper offers distinctive advantages from the standpoint of performance and fuel economy.

Note—"Combined Steam and Gas Turbines Permit Use of High-Moisture-Content Fuels"—starts page 60.

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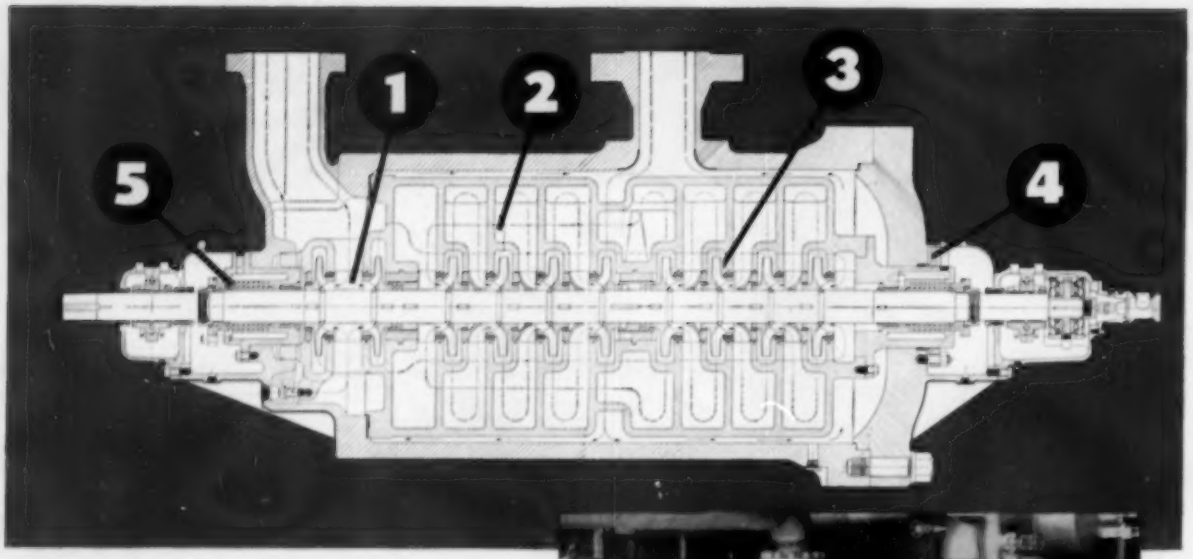
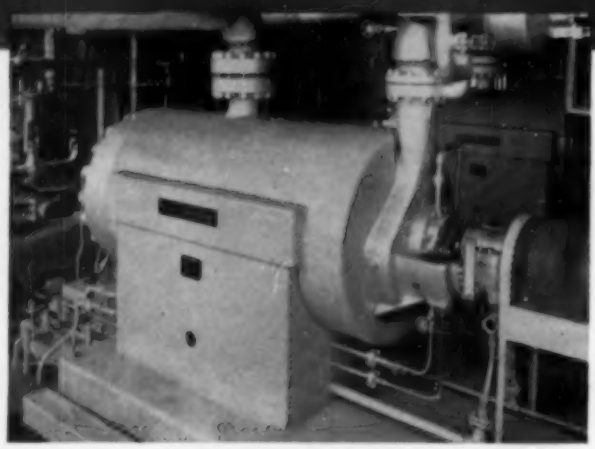
Get These 5 Features for Top Boiler Feed Pump Value





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Volume 73 Number 2

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SOUTHERN POWER AND INDUSTRY

Vol. 73
No. 2

FEBRUARY
1955

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Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

February, 1955

► THE SOUTH IN 1975--SP&I's January issue, pages 39-42, presented a four page highlight report on "What we have . . . What we need." Material was adapted from Dr. Frank J. Soday's report to the Southern Governors' Conference. Dr. Soday is president of the Southern Association of Science and Industry.

Report emphasized the South's major assets--raw materials and energy sources . . . water . . . transportation . . . new and modern industrial plants . . . industries with a strong technological base . . . and growing markets. Our deficiencies were also noted--industrial and scholastic research . . . production of scientists and engineers . . . market research . . . and the need for improved coordination of groups working to promote regional progress.

For a complete copy of Dr. Soday's report--THE SOUTH IN 1975--direct your letterhead request to S.A.S.I., 5009 Peachtree Rd., Atlanta, Georgia.

► MERCURY ROUTED A LIGHTING HEADACHE for the huge Douglas aircraft manufacturing plant in Tulsa, Oklahoma. Addition of mercury types of lighting solved a problem without disposing uneconomically of fluorescent equipment which could not, in itself, be modernized. Solution paid for itself through savings in production efficiency.

Two types of mercury lamps were combined with the existing 85-watt RF fluorescent lamps. Foot-candles were raised from 25 to an average of 65. Better production idea is applicable to both new and old plants.

► WASHABLE, SELF-CHARGING, ELECTROSTATIC AIR CLEANER, exhibited at the recent Heating and Ventilating Exposition, operates on the principle that certain plastics, resins and waxes, when subjected to an air stream, develop an electrostatic charge of sufficient magnitude to attract and retain particles of dust, smoke, soot and other dispersed solids from the atmosphere.

Shredded polyethylene is the filtering medium in one commercial unit. It is packed in conventional filter panels and available for a wide range of filters now in use. When clogged it is cleaned by a simple rinsing in clear cold water, then drained and replaced.

► POLYETHYLENE INSULATED POWER CABLE is extensively used at Carbide and Carbon's Seadrift, Texas, plant. A total of 130,000 lineal ft of single conductor 15 kv polyethylene insulated cable with 156 splices and 180 terminations was used in installing the plant's primary distribution system. This does not include some 22,000 ft of 5 kv cable and 38,000 ft of series street lighting cable insulated with polyethylene.

Detailed information on the installation by Brown and Root, Inc., is published in "Kabelitems" Number 75 available from the Bakelite Company, 30 East 42nd Street, New York 17, N. Y. Presentation is of interest in that it sets forth new information on the installation and use of such cables.

(Continued on page 6)

A 3-section, 8-unit, Allen-Bradley Multi-Unit Control Center operating a large electric furnace. Door open to show circuit breaker.

Bulletin 798
Multi-Unit Control Centers

NEATER • SAFER • INTERCHANGEABLE • ADAPTABLE

• There is a strong trend in modern plant layouts to concentrate motor controls in "control centers" like Allen-Bradley Bulletin 798 Multi-Unit Controls.

Bringing your motor controls together in one spot makes for more systematic inspection. It also prevents unauthorized changes in fuses, circuit breakers, and timing relay adjustments. It slicks up your plant and gives it a more modern, streamlined appearance. In fact, it often saves you the cost of providing special enclosures because control centers can be installed away from processes that are dusty, wet, or hazardous.

Let us send you an interesting, illustrated, 28-page booklet on Bulletin 798 Multi-Unit Controls. It shows the flexibility and adaptability of these versatile control units.

Allen-Bradley Co., 1328 S. Second St., Milwaukee 4, Wisconsin
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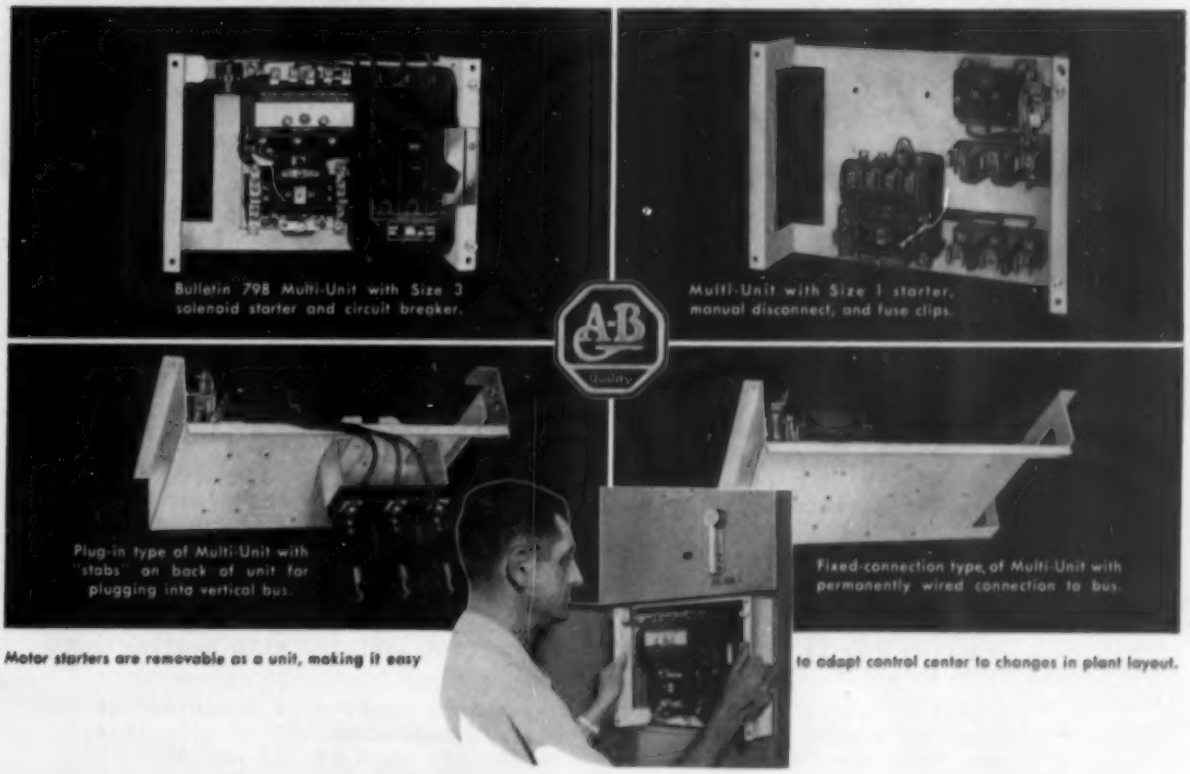
Bulletin 798 Multi-Unit with Size 3 solenoid starter and circuit breaker.
Multi-Unit with Size 1 starter, manual disconnect, and fuse clips.
A-B
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Plug-in type of Multi-Unit with "stabs" on back of unit for plugging into vertical bus.
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Motor starters are removable as a unit, making it easy to adapt control center to changes in plant layout.

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facts and trends (continued from page 4)

► MOTOR CONDENSATION DAMAGE was extensive on the spar milling machines in Temco Aircraft Corporation's Dallas, Texas, plant. When operation was more or less continuous, little maintenance was required. But when one or several of the mills shut down for a short time, trouble started.

Electricians soon diagnosed the cause--when a motor stopped and its temperature dropped, moisture from the motor's water-cooling system condensed on the motor windings. This dampened the winding insulation, grounded the wiring and caused it to burn out.

An automatic motor drying device was the answer. How plant electricians applied a low voltage load, automatically regulated by the motor's coolant pump, is described in this issue. Safety features protect the low voltage transformers.

► STAINLESS STEEL FLOOR GRATING is now being marketed by Nashville's Kerrigan Iron Works. The chemical resistant, non-magnetic grating should find wide acceptance in the chemical, oil and packing industries.

► SWING TOWARD ELECTRIC RADIANT HEAT is predicted in a wide variety of applications. Recent studies at Duke University show that when full advantage is taken of design and application information, operating costs are competitive with those of other sources of heat. Initial investment and space requirements are considerably less when far-infrared radiant heat is used plus the advantages of better control and more consistent and dependable results.

► INDUSTRIAL WASTE WATER--Test for Toxicity of Industrial Waste Water to Fish, a new standard (D 1345-54T) recently issued by the American Society for Testing Materials, is a biological method believed to yield significant information on the character of industrial wastes not obtainable by strictly analytical procedures.

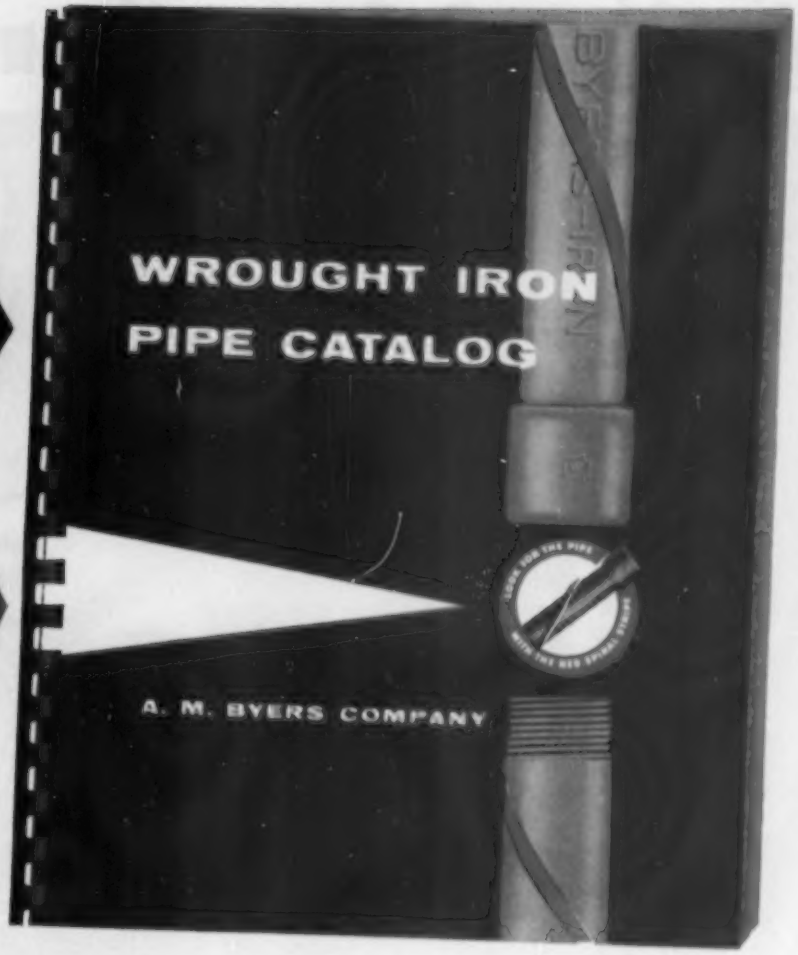
► ANY OBJECTIONS?--Several important topics in the field of international standardization were considered by the recent Tenth General Conference on Weights and Measures meeting in France. Definite progress was reported on a project to redefine the standard meter in terms of a wavelength of monochromatic light from a single isotope, and the results of a recalibration of national standards of mass were considered. Redetermination of the force of gravity was also discussed.

► ROLL BONDED ALUMINUM SHEET by Reynolds Metals Co. is a new product for use in heat exchangers where tube fastened to sheet has been used in the past. Largest immediate application is the refrigeration industry for it eliminates many problems associated with bonding tube to sheet.

A pattern corresponding to the passageways desired is "printed" on aluminum sheet. An "unprinted" sheet is placed on top of a "printed" one, both are heated to a high temperature, and by the use of tremendous rolling pressure they are bonded together over the entire area not covered by the "printed" pattern. Hydraulic pressure opens up the passageways over the entire "printed" pattern to the exact size and cross section desired.

Problems ordinarily encountered with brazed assemblies do not exist. Since the passageway obtained by the roll bonding process is an integral part of the sheet, the usual limitations imposed by welding, bonding, expansion, and assembly do not apply.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.



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. . . proper ordering methods so you get exactly what you want for the job

. . . general notes on mill standards

. . . complete tables on every type of wrought iron pipe, conduit, cold drawn tubing, with detailed data on sizes, dimensions, weights, mill test pressures

. . . helpful tables on decimal equivalents for calculating; dimensions of pipe in fractions of an inch; conversion factors

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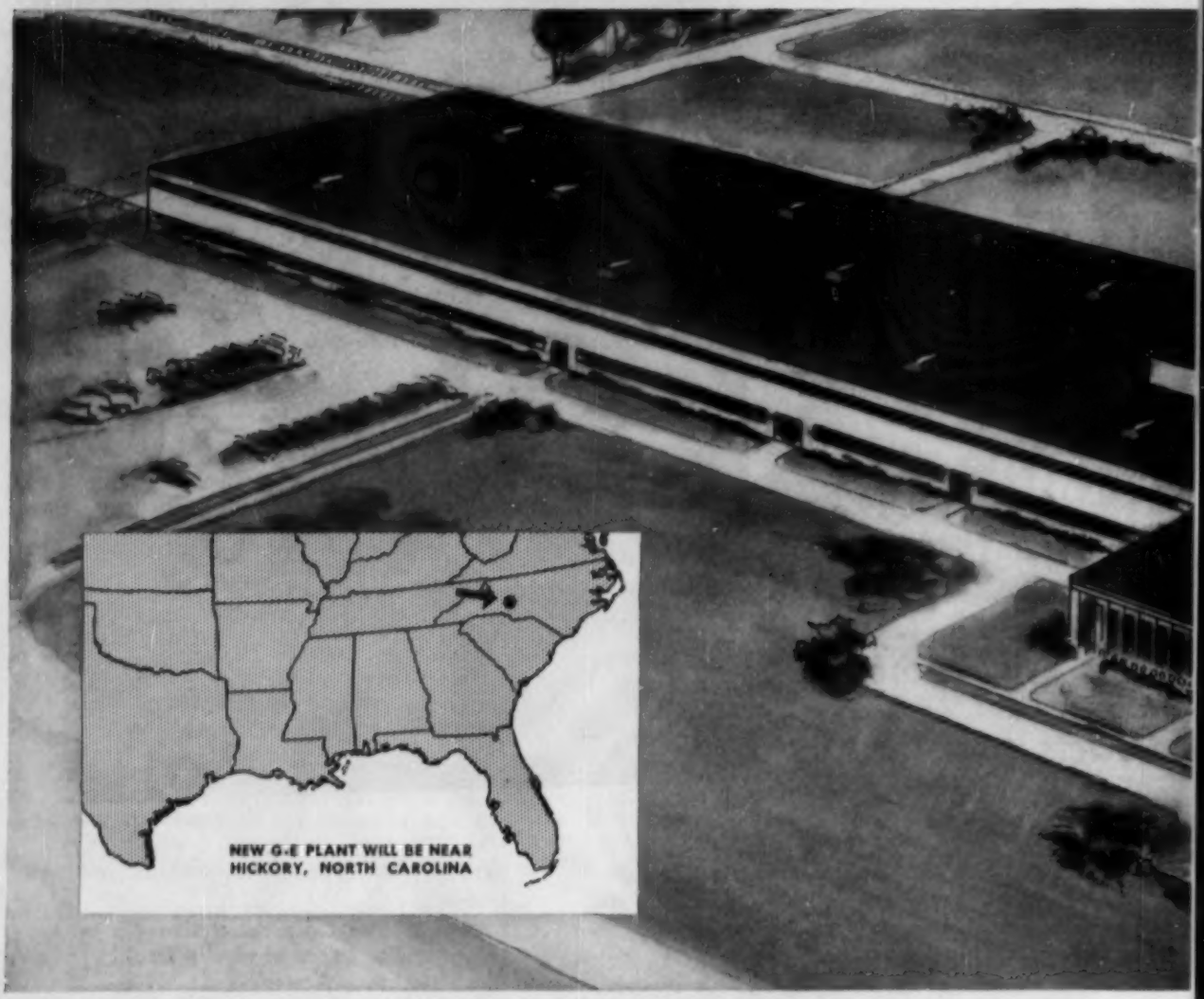
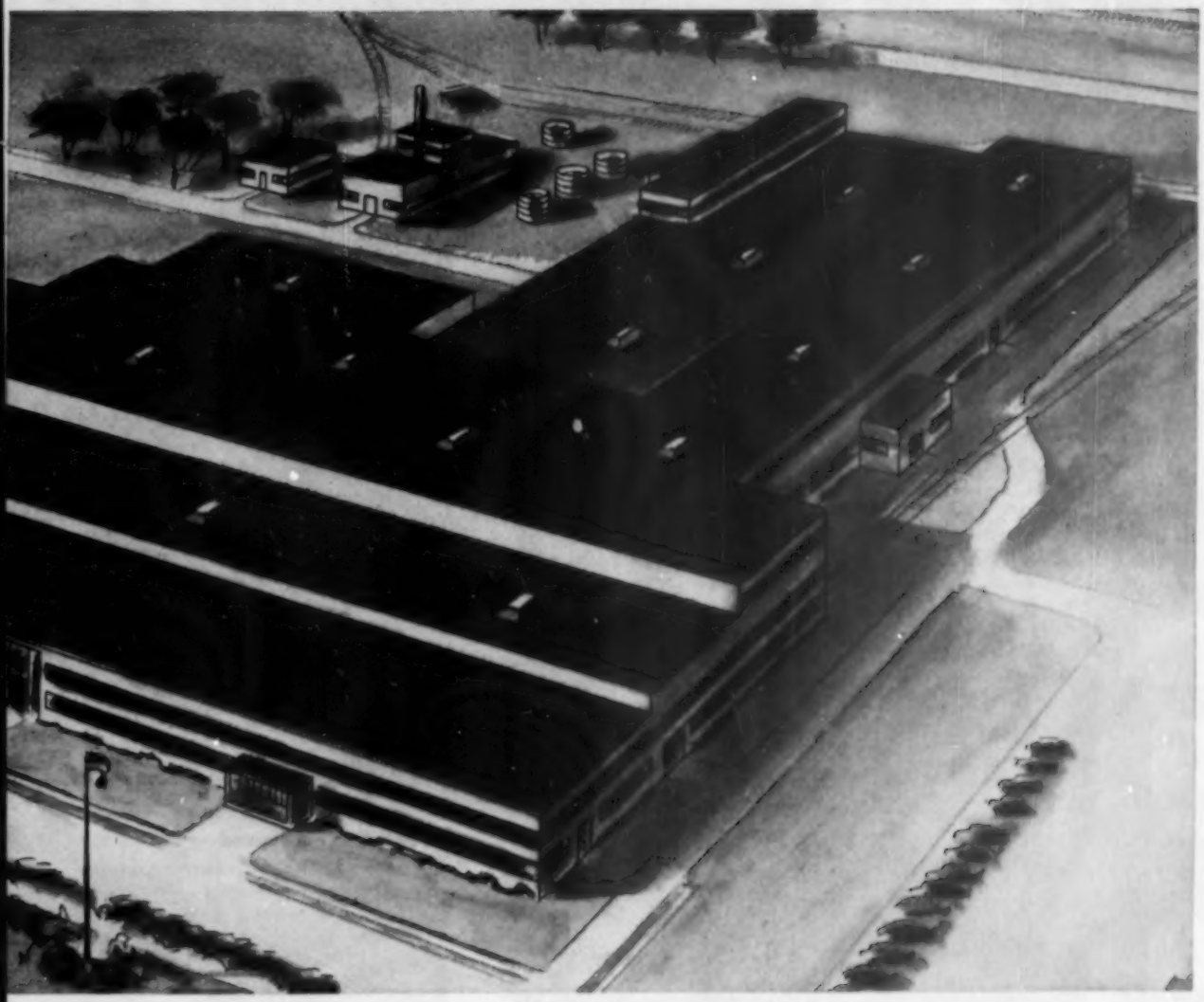


NEW GENERAL ELECTRIC PLANT WILL MANUFACTURE A COMPLETE LINE OF POLE-TYPE DISTRIBUTION TRANSFORMERS

to serve the booming South



NEW TWENTY-MILLION-DOLLAR DISTRIBUTION TRANSFORMER PLANT TO BE BUILT IN HICKORY-NEWTON-CONOVER AREA OF NORTH CAROLINA

Located in the foothills of the Piedmont Range within 100 miles of Charlotte, this new General Electric plant is scheduled for completion late in 1956 and will eventually employ over eleven hundred people. The second major G-E transformer expansion into the South—General Electric's Medium Transformer Plant in Rome, Georgia, was opened in May, 1954—this new plant will build distribution transformers for electric utility and industrial use. It should enable General Electric to better serve your growing electrical needs. General Electric Company, Schenectady 5, New York. 451-29

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NEWS *for the South and Southwest*

Dallas and Memphis Offices for Bailey Meter Company

BAILEY METER COMPANY, manufacturer of industrial instruments and automatic control equipment, has announced the establishment of new district offices in DALLAS, TEXAS and MEMPHIS, TENN.

F. D. KRUSEMARK is manager of the Dallas office, located at 6331 Aberdeen Ave., Dallas 30, Texas. The Memphis office is under the managership of R. E. BYERS, and is located at 3256 Hendricks Ave., Memphis 11, Tenn.

The Dallas district covers the territory of northern Texas and northwestern Louisiana. The Memphis district includes western Tennessee, northern Mississippi, and the state of Arkansas.

F. D. Krusemark and R. E. Byers

Atlantic Steel to Expand Warehouse Div.

ATLANTIC STEEL COMPANY, Atlanta, Georgia, has announced plans to increase its Warehouse Division facilities by 50%.

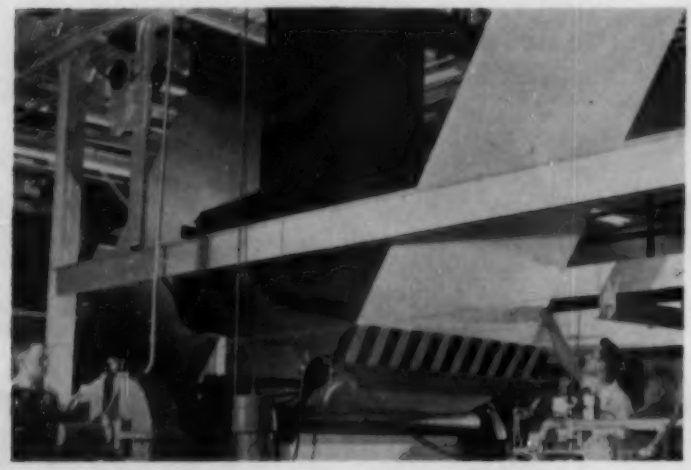
A new bay, 540 ft long and 70 ft wide, will add 37,800 sq ft to the existing warehouse, making a total of more than 100,000 sq ft. This additional bay will be used primarily to warehouse heavy structural steel and allow Atlantic Steel to expand its product line.

MILTON C. SARRAN, manager of the Warehouse Division, said that a new, big friction saw for cutting large structural sections, and a shear capable of cutting sheets up to 144 in. long will be installed in the new bay.

The structure, together with overhead cranes and other equipment, will cost about $275,000 and is expected to be completed in six months.

Atlantic Steel entered the steel warehouse business in 1947. In 1952 it constructed new warehouse facilities and an office building at a cost of more than $500,000. The division serves about 4,000 customers throughout the Southeast.

The new bay will be of structural steel and brick construction, matching the present building which is located on Fourteenth Street at Northside Drive, Atlanta, Georgia.



North Carolina Tire Cord-Treating Factory

Most important recent advancement in tire cord engineering is the development by FIRESTONE TIRE & RUBBER COMPANY of giant electronically controlled cord-tensioning and gum-dipping equipment that will make tires safer, stronger and longer wearing. First equipment of this kind was recently put into operation at Firestone's GASTONIA, NORTH CAROLINA, plant.

The huge unit, as high as a five-story building and three times as long, gum dips the tire cord, stretches it and tempers it in one continuous electronically controlled operation. The unit contains a chemical mixing section, giant gas-fired, multiple heat-treating towers, and bank after bank of huge, individually powered tension rolls. In the above photo, the fabric is being gum dipped before passing through high-temperature heat-treating towers and several series of tension rolls.

Texas Synthetic Rubber Facilities Purchased

GOODRICH-GULF CHEMICALS, INC., a company owned half by THE B. F. GOODRICH COMPANY and half by GULF OIL CORPORATION, has agreed to purchase two Government-owned synthetic rubber facilities in Port Neches, Texas, according to W. S. Richardson, president of Goodrich-Gulf Chemicals, Inc. Mr. Richardson is also president of The B. F. Goodrich Company.

Agreement to purchase Plancor 983, a 90,000 long ton GR-S copolymer plant, now operated by B. F. Goodrich Chemical Company, and an undivided half interest in Plancor 933, a 197,000 short ton butadiene plant, presently operated for the Government by Neches Butane Products Corporation, both in Port Neches, was reached in Washington, D. C. recently by officials of Goodrich-Gulf Chemicals, Inc., and the Rubber Producing Facilities Disposal Commission.

THE TEXAS COMPANY and the UNITED STATES RUBBER COMPANY, it is understood, have also agreed to

PRECISION ANALYSIS OF STRESSES

COMPREHENSIVE SHOP FACILITIES

SKILLED INSTALLATION CREWS

CONTINUOUS EVALUATION OF MATERIALS

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NEW BOOKLET ON POWER PIPING NOW AVAILABLE

Here's a new booklet describing in detail the specific services and facilities that Kellogg brings to the utility power piping field.

It will take you on a tour of the metallurgical labs, the piping analysis section, the welding practices group, the fabricating shops and into the field where skilled Kellogg crews install critical high-temperature, high-pressure steam piping.

Everyone who is interested in power piping for the modern central power station should send for a copy.

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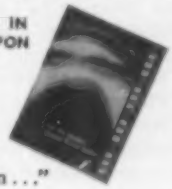

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POWER PIPING

News for the South and Southwest (continued)

purchase an undivided half interest in the butadiene plant sharing power and other central plant service facilities with Goodrich-Gulf Chemicals, Inc.

Butadiene, derived from petroleum, is a major raw material required for the manufacture of GR-S, the Government's general purpose American rubber.

B. F. Goodrich built for the Government, the two copolymer plants at Port Neches now having a total rated capacity of 180,000 tons, and has operated one of the two plants continuously since 1943. Butadiene for these plants comes by pipeline from Plancor 933 a few hundred feet away. Gulf, Texas, Pure Oil, Atlantic and Magnolia Oil companies were the original constituent companies in Neches Butane Products Company.

Southwest Steel Products' New Orleans Plant

Steel products for the construction industry in a five-state area have started flowing from the big new steel fabricating plant of SOUTHWEST STEEL PRODUCTS recently completed on New Orleans' Industrial Canal.

The new plant, covering two acres, will supply fabricated reinforcing steel and joists to construction firms in Louisiana, Arkansas, Mississippi, Alabama, and Florida.

Southwest Steel Products is a wholly-owned subsidiary of Armco Steel Corporation and has two plants in Houston, in addition to the new plant in New Orleans.

Operations of the new plant will mean a substantial increase in tonnage moving through the Port since from 15,000 to 20,000 tons of steel per year will be brought into New Orleans by barge from the Houston mill of Sheffield Steel, also a division of Armco.

Situated on a 28-acre tract, the plant consists of a large storage bay, shop offices, and two fabricating shops. The engineering and design work were done by WILLIAM R. BURK, Associated Architects and Engineers of New Orleans, and general contractors were FARNSWORTH AND CHAMBERS of New Orleans.

The plant has frontage on Slip No. 3 where it will operate a barge dock for unloading inbound shipments of reinforcing steel, merchant bars and angles from the Sheffield plant in Houston.

A constantly growing demand for Southwest Steel products in New Orleans, the surrounding coastal area, and up into inland Louisiana, Mississippi, and Arkansas, led to Southwest's decision to build a plant here, Russell Jolley, president, said.

CARL C. DUDLEY, who has been in the steel business since 1933, is district manager in charge of sales throughout the territory served by the New Orleans plant. WILLIAM BOUNDS, formerly of Houston, a graduate engineer, who has been with Southwest Steel Products since 1950, is plant superintendent.

More News—Page 108

$2 Million Wool Processing Plant for Jamestown, S. C.

Construction has started on the new $2 million SANTEE RIVER WOOL COMBING plant near JAMESTOWN, SOUTH CAROLINA.

Built to process 15,000,000 lb of wool annually, the modern, one-story plant will initially employ some 200 persons. The general contractor for the project, DANIEL CONSTRUCTION COMPANY of Greenville, S. C. and Birmingham, Ala., reports that the mill will cost an estimated $2,000,000 and has been designed to permit greater expansion at a later date.

The Santee River Wool Combing Company plant is the second wool processing plant built by Daniel in the Jamestown area during the past year. Both are located near the new port of entry for raw wool at Charleston, S. C. Engineers for the project are LOCKWOOD GREENE ENGINEERS, INC., of New York.

FUTURE EVENTS
Of Engineering Interest

NATIONAL ASSOCIATION OF PURCHASING AGENTS, Fred D. Bradley, Chm. Public Utility Buyers' Group, Southern Union Gas Co. Burt Bldg., Dallas 1 Texas.
Feb. 13-15, 24th Annual Mid-Winter Conference, Shamrock Hotel, Houston, Texas.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, A. B. Campbell, Exec. Sec'y., 1061 M & M Building, Houston 2, Texas.
Mar. 7-11, Eleventh Annual Conference and Exhibition, Palmer House, Chicago, Ill.

NATURAL GASOLINE ASSOCIATION OF AMERICA, Wm. F. Lowe, Sec'y-Treas., 422 Kennedy Bldg. Tulsa 3, Okla.
Feb. 25, Permian Basin Regional Meeting, Scharbauer Hotel, Midland, Texas.
Apr. 13-15, 34th Annual Convention, Baker and Adolphus Hotels, Dallas Texas.

SOUTHERN SAFETY CONFERENCE, INC., W. L. Groth, Exec. Dir., P. O. Box 8927, Richmond 25, Va.
Feb. 27-Mar. 1 16th Annual Conference and Exposition, Jung Hotel, New Orleans, La.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS, W. F. Leonard, Sec'y, 343 S. Dearborn St., Chicago 4, Ill.
Apr. 13-15, Annual Meeting and Exhibit, Chicago, Ill.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 39th St., New York N. Y.
Apr. 18-21, Diamond Jubilee Spring Meeting Lord Baltimore and Southern Hotels, Baltimore, Md.

NATIONAL MATERIALS HANDLING EXPOSITION, Clapp & Poliak, Inc. 341 Madison Ave., New York 17, N. Y.
May 16-20, Exposition, International Amphitheatre, Chicago, Ill.

INDUSTRIAL MARKETING ASSOCIATES INC., John Paul Taylor, Exec. Sec'y, 520 Pleasant St., St. Joseph, Mich.
May 22-26, Annual Meeting, The Cloister, Sea Island, Georgia.

BASIC MATERIALS CONFERENCE AND EXPOSITION, Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.
May 31-June 3, Conference and Exposition, Philadelphia, Pa.

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Stumped occasionally by frozen nuts, studs, bearings and other parts? Here's positive relief. KANO KROIL is a new chemical so remarkably effective it continues to amaze even those who have used it for years.

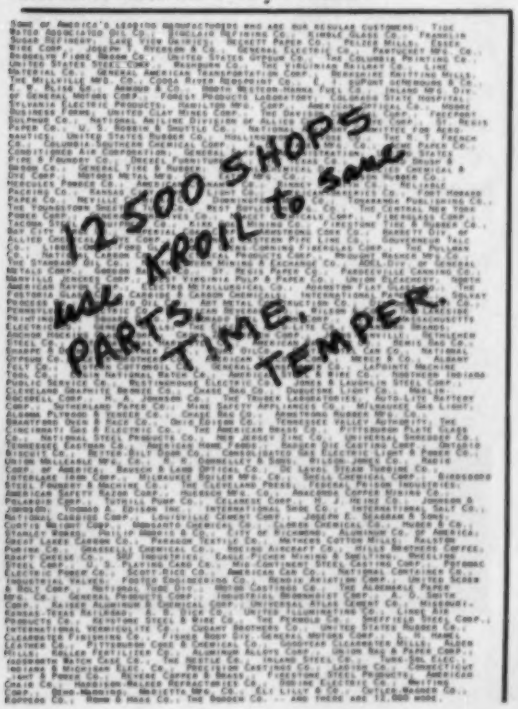
Laboratory Tests prove that it penetrates openings as small as a ***Millionth*** of an inch.

Case Records prove it goes straight to the heart of the toughest problem—destroys corrosion, provides lubrication, frees the part.

Your Own Experience will prove that it does the things you've always hoped for but never have been able to find in penetrating oils.

Proof? First, read the panel describing the kind of problems KROIL licks every day. Next, note the kind of companies that have been using KROIL five years or more.

Then, considering the cost of man hours, decide whether you can afford not to have this valuable chemical tool on every bench.



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For years an engine block had been exposed to the elements and the action of salt water on a Florida beach. Kano Kroil was applied to the studs which were then removed without breaking.

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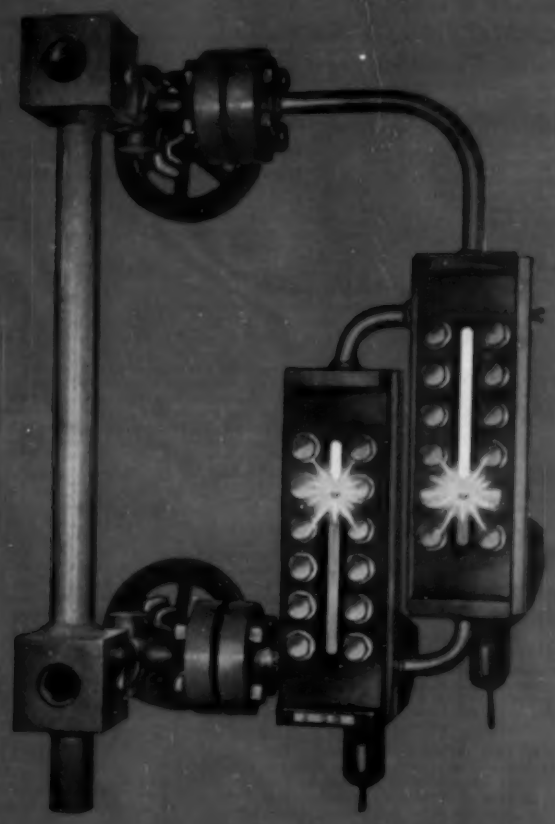

YARWAY WATER GAGES

Flat glass, high pressure type shown, features new separated-design insert and Type "M" illumination that causes water level meniscus to "shine like a star". Described in Yarway Bulletin WG-1812.

YARWAY REMOTE SIGNAL ALARMS

Lights on horns, operated by Control Unit on Yarway Indicator, give instant warning of any serious deviation from normal water level. Can be located anywhere in plant. Described in Yarway Bulletin WG-1824.

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Gives a continuous 24-hour record of liquid levels. Actuating mechanism is same as in Yarway Indicator. Used both for indicating and recording. Described in Yarway Bulletin WG-1830.

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Simplified system consists of compact camera and panel-mounted monitor. Clear, bright image of water level gage anywhere in the plant. Described in Yarway Bulletin WG-1813.

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STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

7 **STEAM GENERATORS** — Catalog 1218—Describes packaged units 15 to 500 hp. Gives construction details of models for single or multiple fuel firing.—ORR & SEMBOWER, INC.

9 **PACKAGED BOILERS** — Bulletin AXY-1 generally describes the features and design of "Amesteam" Generators —shows how installation of these units provide dependable low cost steam for all types of plants—AMES IRON WORKS, INC.

25 **DOUBLE-PASS BOILERS** — Bulletin 155—Gives complete specifications of a new double pass all-purpose industrial and heating boiler, "Southern made for Southern trade." Sizes from 44 to 153 hp S.B.I. with pressure up to 150 lb, designed for coal, gas or oil firing. This is a complete package double-pass unit, recently added to a regular line of single-pass firebox boilers manufactured since 1918.—LUCEY BOILER & MANUFACTURING CORP.

26 **OVER-FIRE JETS TO PREVENT SMOKE**—Technical Report No. VII, 24 pages, describes the application of over-fire jets to prevent smoke from stationary plants using coal—how to design, construct and install, and how to use.—BITUMINOUS COAL RESEARCH, INC.

30 **PACKAGE BURNER UNITS—FOR BOILERS**—Folder 2527. Describes conversion burner engineered as single complete unit including burner, fuel system, forced draft air supply, control panel and pre-formed refractory combustion throat, oil, gas or combination fuel for all types of power and heating boilers.—IRON FIREMAN MFG. CO.

35 **UNIT STEAM BOILERS**—Catalog AD-100 — Gives complete information on oil and gas fired "Self Contained" boilers, 15 to 500 hp, 15 to 250 psi for processing and for heating. Gives features, applications, efficiencies, capacities and dimensions.—CLEAVER-BROOKS CO.

41 **BREECHINGS** — Booklet F-3, 27 pages—Depicts plant and equipment for producing breechings, casings, panel boards and other items of steel fabrication up to ¼" thickness. Profusely illustrated with representative photographs of products.—THE KIRK & BLUM MANUFACTURING COMPANY.

48 **BOILER TUBES** — Booklet, available upon request, gives details concerning weights and other data of tubing and pipe, their working pressure scales, and the bending operations used in forming. Useful charts and engineering information. —BOILER TUBE CO. OF AMERICA.

49 **MULTISTAGE TURBINES** — Bulletin S-146—Describes straight condensing, straight non-condensing, condensing bleeder, non-condensing bleeder, low pressure condensing, mixed pressure condensing, mixed pressure bleeder turbines; 200 to 3,000 hp.—THE TERRY STEAM TURBINE CO.

51 **WATER-TUBE STEAM GENERATOR**—Booklet "Type A." 8 pages—Gives data and specifications for complete factory assembled steam generator units in nine sizes, from 5300 to 32,000 lb per hr, for pressures up to 400 psi, designed to provide fully automatic firing with oil, gas or stoker-fired coal.—SUPERIOR COMBUSTION INDUSTRIES, INC.

58 **OIL BURNERS**—Bulletin 24—Describes the SAL steam atomizing oil burner, a large capacity unit with great flexibility of performance. Fewer burners with higher performance. NATIONAL AIR-OIL MFG. CO., INC.

71 **STEAM ACCUMULATORS** — Bulletin RA-52-5—Describes well known steam accumulators to balance steam supply and steam demand in intermittent processes such as are found in brewing food processing, refining, paper and textile plants.—FOSTER WHEELER CORP.

82 **DUAL-MOTOR DESLAGGING**—Bulletin 1016—Describes retractable soot blower for effective water wall deslagging. One motor extends the swivel tube fast to save time, and retracts it fast to escape high temperatures. The other motor rotates the tube slowly to clean thoroughly. High power jets combined with large mass produce high striking power.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

108 **RECIPROCATING COMPRESSOR** —Bulletin M-70, 44 pages—The M-Line multi-stage, multi-cylinder, 100 to 5000 hp, 250 to 514 rpm reciprocating compressors. Applications and installations illustrated with photographs and cut-away views.—THE COOPER-BESSEMER CORP.

109 **DEAERATING HEATERS, SPRAY TYPE** — Catalog W-101 — Describes and illustrates Graver spray deaerating heaters and other types of Graver deaerating heaters — data covering performance, results and applications—typical plant flow diagrams—accessory equipment.—GRAVER WATER CONDITIONING COMPANY.

112 **INDUSTRIAL FANS**—Bulletin 702 —Describes the new Clarage Type XL fans for industrial air and material handling. Covers entire size range — 11" through 60" inlet diameters, pressures up to 15" SP, volumes to 130,000 cfm.—CLARAGE FAN COMPANY.

118 **ROTARY PUMPS**—Catalog 955—8 pages—Describes and illustrates the complete line of Roper Rotary Pump products. Sizes range from ⅝ to 600 gpm for pressures up to 1000 psi. Has listing of materials of construction, performance data and dimensions.GEO. D. ROPER CORPORATION.

167 **ROTARY PUMPS**—Bulletin 307— Describes the features and advantages, and outlines the engineering details of Blackmer rotary pumps. These have been manufactured since 1904 and incorporate the outstanding advantages of "automatic adjustment for wear," and economical replacement of parts.—BLACKMER PUMP CO.

174 **LOW PRESSURE EVAPORATORS** — Bulletin, 12 pages — Describes various types of evaporator plants — film type, high pressure and low pressure submerged tube types—the advantages of each type and its various equipment—and the engineering details of Conoco single-effect and multiple-effect evaporators. — CONDENSER SERVICE & ENGINEERING CO. INC.

INSTRUMENTS—METERS CONTROLS—REGULATORS

208 **WATER LEVEL ALARMS** — Brochure A7—Describes float operated low and high water level alarms and fuel cut-offs—for low pressure boilers, tanks and other vessels.—RELIANCE GAUGE COLUMN CO.

210 **WATER TEMPERATURE CONTROL** — Booklet describes complete line of controls for regulation of water temperatures, with flow of water from 1 gallon to 10,000 gpm. — POWERS REGULATOR COMPANY.

219 **NON-FROSTING GAGES** — Unit Data 177—Describes and illustrates non-frosting gages for use in reading liquid levels in processes involving low temperature fluids—particularly in the chemical, petroleum and process industries—for ammonia, freon and other gases.—JERGUSON GAGE & VALVE CO.

227 **LIQUID LEVEL GAGES**—Bulletin 11-1-51—Describes gages for water level or liquid level, water columns and the like—bronze, all-iron, forged steel, stainless steel for all sorts of industrial, chemical and power plant service, with details as to available sizes, applications and installations.—ERNST WATER COLUMN & GAGE CO.

267 **EASY READING THROUGH LIQUID LEVEL INDICATOR**—Bulletin WG-1522—Gives the advantages of remote liquid level indicators reporting at convenient sight level, the levels in boilers, heaters, tanks and other vessels—up to 1500 psi.—YARNALL-WARING COMPANY.

281 **THREE-INFLUENCE FEED CONTROL**—Bulletin 1013-A—Describes Copes Type 3-L instrument-type feedwater control. Feed is modulated by three influences—steam flow, feedwater flow and drum water level. Miniature or standard recorders may be used or eliminated as desired.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

293 **BOILER METERS**—Bulletin 46B— Shows five ways to reduce boiler operating costs—types of Bailey boiler meters and how they are used—instructions, installation, and engineering data.—THE BAILEY METER CO.

PLANT EQUIPMENT—WELDING TOOLS—PROCESS SPECIALTIES

303 **STEEL STORAGE TANKS** — Bulletin, 4 pages—"Welded Steel Tanks for Oil Storage"—contains a table giving diameters, heights, weights and shell ring thicknesses, for standard, flat-bottom tanks in a complete range of sizes from 500 to 150,000 barrels capacity. — CHICAGO BRIDGE & IRON CO.

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397 **SPRAY LUBRICATOR** — Catalog 528—Covers Manzel equipment for the modern spray method of lubricating punches, shearknives, dies, conveyors, and other operations. Lengthens die life, keeps work cool and clean.—MANZEL DIVISION of FRONTIER INDUSTRIES, INC.

PIPING, VALVES, FITTINGS STEAM SPECIALTIES, TRAPS

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413 **LP-GAS VALVES**—Bulletin V-110—Presents the Fairbanks line of Underwriters' approved LP-gas bronze valves—globes, gates and checks. Construction features insuring tight seal, and basic specifications. — THE FAIRBANKS COMPANY.

436 **WATER GAGE TELEVISION**—Bulletin WG-1813—Illustrates and describes equipment for televising boiler water level gages, including TV camera, illuminator, monitor and all necessary linkage, as well as auxiliary viewing monitors.—YARNALL-WARING COMPANY.

441 **ALUMINUM PIPE JACKETING**—Folder J-25—Gives complete applications and instructions for the use of Childers jacketing for weather-proofing of insulated lines, towers, vessels and tanks. Illustrated with detail drawings.—CHILDERS MFG. CO.

454 **WROUGHT IRON FOR PIPING SYSTEMS**—Bulletin—Gives a fund of helpful information on piping materials and their selection; corrosive conditions in water, drainage and heating systems, and methods for reducing the severity of corrosion.—A. M. BYERS COMPANY.

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463 **JACKETED VALVES**—Bulletins 220 and 221—Describe operational features of jacketed valves for gages or wherever small jacketed angle valves are required. Full specifications, cutaway views, applications.—JERGUSON GAGE & VALVE COMPANY.

496 **PLUG VALVES**—Catalog 46-L describes a complete line of lubricated plug valves for handling acids, solvents, sludges and other troublesome liquids, giving better control, more dependable service and lower operating costs than are usually obtained.—WALWORTH CO.

MAINTENANCE PACKING GASKETS, LUBRICATION

501 **LUBRICATORS** — Catalog 250, 12 pages—Illustrates and describes new design high pressure force feed lubricators for service up to 30,000 lb. for use in chemical plants, utility plants and the like. Dimensions, specifications, illustrations of typical installations. — MANZEL DIVISION OF FRONTIER INDUSTRIES, INC.

506 **PACKING IN GENERAL**—Garlock Catalog — Describes packings for high pressures and low pressures—for water, air, steam, acids, solvents, oil and other liquids and gases.—THE GARLOCK PACKING CO.

509 **LUBRICATION** — Ingenious Lubrication Chart—Gives quick recommendations for the lubrication of equipment and machinery of various sorts—easy to use, accurate in application. — ADAM COOK'S SONS, INC.

511 **MAINTENANCE IDEAS** — "Genius at Work" is a publication containing ideas about plant maintenance, bits of philosophy, new products and a description of the company's line.—KANO LABORATORIES.

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532 **ANODES FOR CATHODIC PROTECTION** — "Magnesium Anodes Data"—Gives general information on magnesium anodes for cathodic protection of industrial equipment, pipe lines and other metal structures subject to corrosion. 5 data sheets, applications of cast, packaged, flexible ribbon and extruded magnesium anodes, with details as to rating, dimensions and the like.—DOWELL, INC.

545 **CORRECT LUBRICATION** — Lubriplate Data Book, 56 pages—Shows the importance of providing and maintaining proper and economical maintenance of all types of plant machinery through adequate lubrication. A valuable guide to superintendents, engineers, managers and others responsible for plant operation and maintenance, particularly for lubrication.—LUBRIPLATE DIVISION, FISKE BROTHERS REFINING CO.

ENGINES, DRIVES POWER TRANSMISSION MATERIALS HANDLING

602 **SUPERCHARGED GAS DIESEL ENGINES** — Bulletin J-53 — Gives complete specifications and data and suggested applications of the Type JS supercharged gas Diesel engine, vertical four cycle, 6 and 8 cylinder, stationary, noted for exceptional fuel savings.— THE COOPER-BESSEMER CORP.

631 **SCREW CONVEYORS** — Catalog ID-541, 68 pages—Illustrates and describes standard and special types of conveyors, with engineering data necessary for selection. Tables give sizes, types, speeds, horsepowers and other information. Accessories included. — CONTINENTAL GIN COMPANY, INDUSTRIAL DIVISION.

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631	637	643	687	708	724	732	786	810	811	851	875	904	905	907	959	992
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Also send further information on following New Equipment (page 98)

B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10	B-11	B-12	B-13	B-14
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643 **AUTOMATIC MONORAIL TRANSPORTATION**—Bulletin AD-1A, 12 pages—Describes a complete range of automatic dispatch monorail systems for transfer of materials by remote control.—AMERICAN MONORAIL CO.

687 **INDUSTRIAL CRANES** — Bulletin PT 1353, 8 pages—Describes a new line of Push-Type Cranes with improved construction features, including light duty models available in five different capacities, and heavy duty models available in seven different capacities. Illustrations, applications.—INDUSTRIAL CRANE & HOIST CORP.

WATER TREATMENT, HEATING, VENTILATING, AIR CONDITIONING REFRIGERATION, DUST & FUME CONTROL

708 **COOLING TOWER DRIVES**—Catalog CT-53 — Gives information on the use of gear reduction drives for cooling tower applications — includes worm gear units, spiral-bevel units and helical-spiral-bevel units. Gives construction and operating details, with illustrations and selection data. —PHILADELPHIA GEAR WORKS.

724 **DUST REMOVAL**—Bulletin 4224, 40 pages, describes mechanical draft equipment, heating, ventilating, drying, air handling and purification equipment, dust collectors and fly ash precipitators, etc. used in the handling of air.—AMERICAN BLOWER CORP.

732 **SPRAY HEATERS**—Bulletin WC-101-A—Describes spray-type deaerating heaters, which use minimum steam—simple, noiseless operation and freedom from scaling and corrosion.—GRAVER WATER CONDITIONING CO.

786 **BOILER WATER CONTROL VALVES**—Bulletin 388-C, 4 pages—Describes the Camomatic valve for use in controlling feedwater in industrial, utility and service plants. Illustrates and explains applications for automatic water softening, pressure filtering, and other chemical process cycling control.—BELCO INDUSTRIAL EQUIPMENT DIVISION, INC.

ELECTRICAL

810 **MOTOR STARTING SWITCHES**—Bulletin 600—Describes a manually operated snap switch with thermal overload device for small motor application. Meets 1947 NEC ruling.—ALLEN-BRADLEY CO.

811 **ELECTRIC HEAT**—"100 Ways to Apply Electric Heat" gives a wealth of informative data on the use of electric heat in industry—fast, uniform, dependable, backed by nation-wide engineering service.—EDWIN L. WIEGAND CO.

851 **"FUSEOLOGY"** — Handbook on Fuses—Intended to help maintenance engineers. Tells what to do when fuses blow, where to look for trouble—what to do after trouble is found—how to select the right type for various circuits—how to choose the proper size of fuse or Fusetron.—BUSSMANN MFG. CO.

875 **COAL MINING WIRE AND CABLE** —Catalog W-51-7—Gives a comprehensive, highly informative booklet describing electrical wires and cables used by the coal mining industry. Includes insulation and jacket compounds, portable cords and cables, and miscellaneous mine equipment. UNITED STATES RUBBER COMPANY.

MISCELLANEOUS . . . SAFETY, BUILDING EQUIPMENT, METALS

904 **STEEL GRATING AND STAIR TREADS**—12 page catalog—Shows "Weldforged" steel construction and application—spiral crossbars, alternating right and left and slightly above bearing bars electrically weldforged into one unit to insure greater non-skid protection and durability.—KERRIGAN IRON WORKS, INC.

905 **ENGINEERING PRODUCTS**—Comprehensive Directory — Lists more than 1600 products and the engineering literature which describes them—technical information and data charts.—ALLIS-CHALMERS MFG. CO.

907 **SHEET METAL PANELS, CUBICLES, ETC.**—Descriptive Booklet — "Contract Manufacturing in Sheet Metals" describes job-tailored control centers, bus enclosures, cubicles, switchgear housings, panel and various other sheet metal assemblies for utility and industrial plant applications.—THE KIRK & BLUM MFG. CO.

959 **THERMAL INSULATION** — Chart IN-6D, 11½ in. x 18 in., suitable for hanging on the wall, shows at a glance the recommended insulation for every temperature range, from minus 400 F to plus 3000 F. —JOHNS-MANVILLE CORP.

992 **FIRE PROTECTION**—Bulletin 2319 describes Blaw-Knox Deluge systems, wet and dry pipe sprinkler systems, water spray and fog systems, rate-of-rise sprinkler systems, etc., and indicates how a sprinkler system pays for itself out of insurance savings. — BLAW-KNOX SPRINKLER DIV., BLAW-KNOX CONSTRUCTION CO.

Continued on page 118

2-55-2

Please send me without obligation, free booklets described in the February, 1955, issue of SOUTHERN POWER AND INDUSTRY as circled below.

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Also send further information on following New Equipment (page 98)

B-1 B-2 B-3 B-4 B-5 B-6 B-7 B-8 B-9 B-10 B-11 B-12 B-13 B-14
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List Items You Want, Tear Out and Mail One of the Attached Cards Now!

Please be sure to fill in your Firm's Name and your position on the Coupon. This service cannot be extended to you unless this information is furnished.

How COOPER-BESSEMER Power digs out Al_2O_3. $2SiO_2$. $2H_2O$... and piles up economy

Another Example of Efficient Power at Lower Cost

This heavy-duty Cooper-Bessemer powered Bucyrus-Erie walking dragline, owned by Southern Clays, Inc., is used to strip overburden in the clay area running northeast from Macon, Georgia.

Al_2O_3. $2SiO_2$. $2H_2O$ . . . chemical symbol for kaolin . . . is a special kind of clay required by the paper, ceramic and rubber industries.

In Georgia, where 80% of the nation's kaolin supply is found, a 550 hp Cooper-Bessemer diesel supplies digging as well as walking power for this big Bucyrus-Erie 7-W dragline used to strip overburden from kaolin.

Stripping to a depth of 100 feet takes a lot of "drag," and an equal amount of Diesel stamina and flexibility. It means hour after hour of no-load-too-full load operation at nearly constant governor-controlled speed.

With Cooper-Bessemer Diesel power, there's not only top availability, but instant response and smooth operation at any load . . . on the most rugged of dragline jobs. It adds up to maximum production at minimum cost.

If your plans call for powering or repowering — mobile, stationary, marine — contact our nearest office for complete facts on Cooper-Bessemer advanced, money-saving features.

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DIESELS • GAS ENGINES • GAS-DIESELS • ENGINE-DRIVEN AND MOTOR-DRIVEN COMPRESSORS

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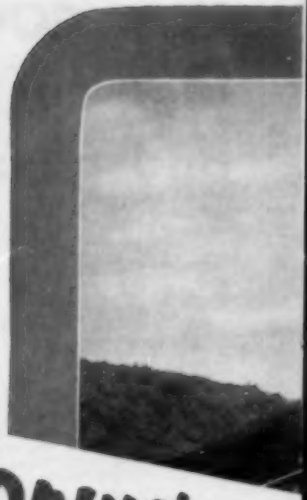
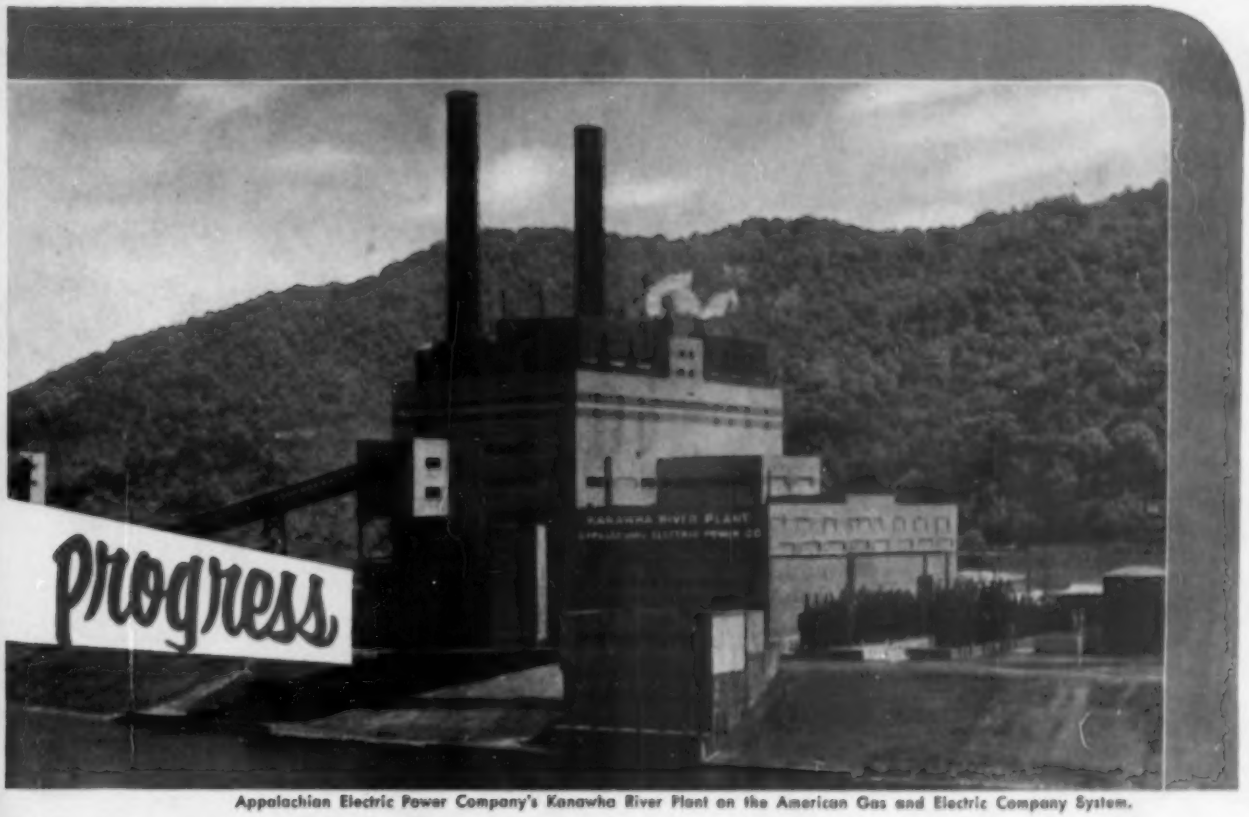


10 BEST ANNUAL HEAT RATES

(Plant Net Heat Rates)
Btu per kwhr*

9170 KANAWHA	**Appalachian Electric Power Co. on the American Gas and Electric System—** Two B&W Pressure-Fired Radiant Reheat Boilers with Gas Recirculation and Divided Furnace Construction.
9329 TANNERS CREEK	**Indiana and Michigan Electric Co. on the American Gas and Electric System—** Three B&W Pressure-Fired Radiant Reheat Boilers with Gas Recirculation and Divided Furnace Construction.
9418 ALBANY	**Niagara Mohawk Power Corporation.**
9454 SCHILLER	**Public Service Co. of New Hampshire—** Two B&W-built Mercury Boilers.
9510 DUNKIRK	**Niagara Mohawk Power Corporation.**
9540 J. R. WHITING	**Consumers Power—** Three B&W Radiant Reheat Boilers.
9594 PHILIP SPORN	**Appalachian Electric Power Co. and The Ohio Power Co. on the American Gas and Electric System—** Four B&W Pressure-Fired Radiant Reheat Boilers with Gas Recirculation and Divided Furnace Construction.
9630 ST. CLAIR	**Detroit Edison Co.—** Four B&W Radiant Reheat Boilers with Gas Recirculation and Divided Furnace Construction.
9661 EASTLAKE	**The Cleveland Electric Illuminating Co.**
9815 ASTORIA	**Consolidated Edison Co. of New York, Inc.—** Two B&W Pressure-Fired Radiant Reheat Boilers with Gas Recirculation and Divided Furnace Construction.

* Federal Power Commission figures



Appalachian Electric Power Company's Kanawha River Plant on the American Gas and Electric Company System.

Headed by a record 9170 Btu per net kwhr, these ten plants were the most efficient central stations in the country during 1953, the most recent year for which complete heat rate data are available.

Reflecting the decision of the electric companies to utilize the most recent engineering advances, even during a time of critical capacity expansion, the outstanding performance of these modern plants is a tribute to the foresight of the whole industry. It affords one more indication that the prime interest of this unique team of electric companies and their major suppliers lies in producing still lower-cost kilowatts for a still greater America.

B&W Boilers in many of these stations are designed with such advances as Pressure-Firing, Cyclone Steam Separators, Gas Recirculation and Divided Furnace Construction — features which have contributed substantially toward the outstanding efficiency levels achieved. Also, all steam generating units are equipped with reheaters, a development of major importance in improving plant efficiency.

Pressure-Firing

Among the many advantages of this important engineering advance, as utilized, for example, by the Kanawha River units, is elimination of air infiltration to reduce stack loss and assure greater efficiency. Maintenance is reduced and the use of forced-draft fans alone means easier starting, smoother operation and simpler controls. These are the reasons why more than 100 Pressure-Fired B&W units are now in service or under construction.

Cyclone Steam Separators

Operating inside the steam drum, these simple, stationary devices require no power or maintenance and do not take up building room. The Cyclone Separators assure positive natural circulation at high pressure, and with the steam scrubbers, make it possible to send steam of highest purity to the turbine. Consequently, turbine efficiency is maintained and turbine outages reduced.

Divided Furnace Construction

With this B&W construction, building volume is held to a minimum. Both sides of the furnace division wall are used to absorb heat and thus make it possible to achieve the required furnace cooling surface without excessive increase in building volume.

* * * * * *

The record heat rates set by these leading generating stations are closely followed by those of many more plants across the country which are producing low-cost kilowatts at efficiency levels unattainable just a few years ago. And B&W is continuing to devote its energies and its long-accumulated experience to the development of boiler designs that will contribute to still higher levels of steam generating efficiency. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

BABCOCK & WILCOX

BOILER DIVISION

G-696

you'll want COMPLETE DETAILS on these Reducers

...they're in a CLASS by themselves

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. . . in the meantime, note the following features of this Philadelphia Double Herringbone Reducer:

Symmetrical arrangement and balance of gears in relation to the centerline of housing (as compared to usual offset method).

First reduction is through double Helical Gears and pinions, and *Final reduction* is through continuous tooth Herringbone Gear and Pinion. *Anti-friction bearings* of generous proportions, on the ends of each shaft, help absorb the load equally.

Husky, spacious housing, well ribbed and properly sized to give an adequate oil reservoir and large radiating surface for thermal capacity.

These are a few of the exclusive and proven features that have made Philadelphia Units a leader in the field for years.

These Units are available in Single, Double and Triple Reductions . . . ratios from 1.75 to 1 in the Single Unit — up to 292 to 1 in the Triple Unit. Be sure to send for 48 page Catalog H-49.

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NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.
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Industrial Gears & Speed Reducers

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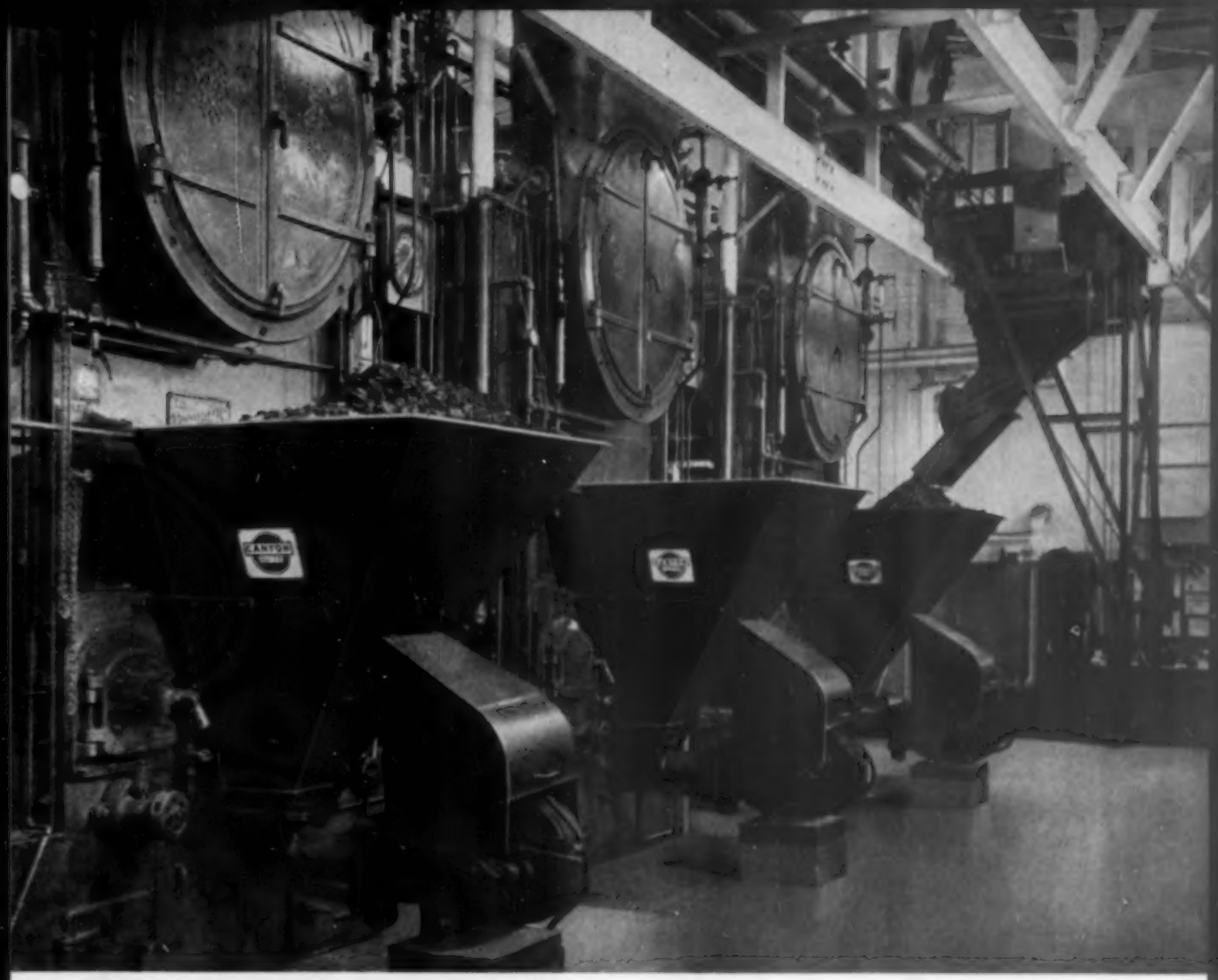
Established 1892



Burning coal the modern way saves Lakewood Hospital 22% in fuel costs

When Lakewood Hospital, Lakewood, Ohio, recently enlarged its facilities, the hospital authorities decided to install a new boiler plant. After careful consideration, they chose coal.

Today the hospital's automatic coal-burning equipment supplies steam at high efficiency to laundry, kitchen, sterilizers and heating system. The coal is handled and burned cleanly, meeting rigid sanitary requirements. And, based on local rates, coal costs $4,068 less per year than natural gas and $6,348 less than oil! Using the lower figure, burning coal the modern way has effected a 22% savings in fuel costs.

Investigate Your Fuel Costs

If you're planning to modernize your plant or build a new one—or if you are just interested in cutting fuel costs—find out how coal, burned the modern way, compares to other fuels. Talk to a consulting engineer or your nearest coal distributor. Their advice may save you thousands of dollars every year.

facts you should know about coal

In most industrial areas, bituminous coal is the lowest-cost fuel available.

Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar.

Automatic coal and ash handling systems can cut your labor cost to a minimum.

Coal is the safest fuel to store and use. No dust or smoke problems when coal is burned with modern equipment.

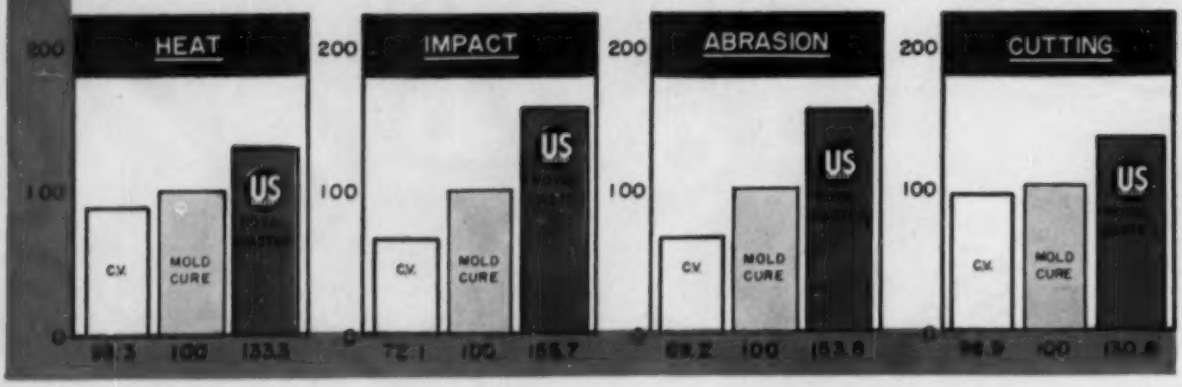
Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

BITUMINOUS COAL INSTITUTE
A Department of National Coal Association
Southern Building, Washington 5, D.C.

STARTLING

Comparative performance of portable cords related to major life factors.



New U. S. ROYAL MASTER portable cord

PROVES SUPERIOR TO ALL OTHERS IN EVERY SERVICE FACTOR!

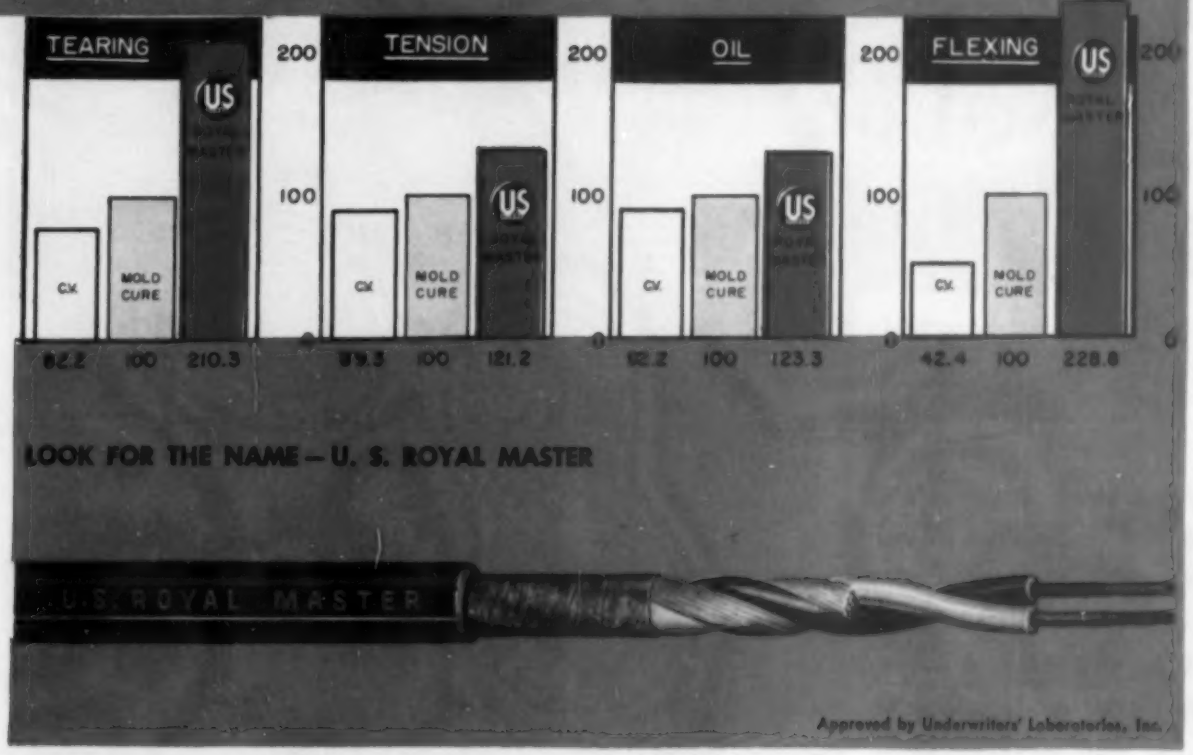
Newly developed U. S. Royal Master Cord gives almost twice the service of other molded cords — gives $1.88 value for every cord $1.00!

Life factor charts illustrate outstanding superiority of new U. S. Royal Master over the average of both the molded cords and the short-lived continuous vulcanized cords of other makes.

US RUBBER

UNITED STATES
ELECTRICAL WIRE & CABLE DEPARTMENT

EVIDENCE!



Cord construction completely reexamined. Over two years ago, U. S. Rubber engineers began a thorough reexamination of electrical cord design and construction. More than a thousand cords, including those of all major competitors as well as our own U. S. Royal Cord, were thoroughly and painstakingly analyzed. Over 10,000 tests were made to determine the principal causes of cord failure.

Every possible life factor was carefully and honestly appraised to find its relation to overall cord service.

With the findings at hand, "U. S." Engineers then drew upon their 64 years of experience in the manufacture of fine quality wire and cable to produce this exceptional new cord.

Every fault uncovered by the exhaustive two-year testing was tackled and solved.

Tested and proved. The new U. S. Royal Master was then tested against all competitive cords—installed in outside plants for final on-the-job corroboration.

U. S. Royal Master Cord proved itself to be unquestionably the finest cord you can buy! So superior, it gives almost double the service life of the average of competitive molded cords—actually gives you $1.88 in value for every cord dollar!

Prove for yourself the phenomenal superiority of U. S. Royal Master. Write to address below for FREE descriptive booklet illustrating the superiority of the U. S. Royal Master Cord. And get in touch with your "U. S." distributor today!

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ROCKEFELLER CENTER, NEW YORK 20, N. Y.

a preference based on performance

After sixty-eight years of service to Southern industry, Standard Oil products continue to be *first* in point of popularity. There's only one answer. To stay first your product must be *dependable,* your service *superior.* Standard Oil was first to offer special lubricants for power plant machinery, and for over half a century these have been improved to meet changing needs. Wherever there are moving parts—from one end of your plant to the other there are special types of Standard Oil lubricants to afford maximum protection. If you would keep your equipment running at peak efficiency and low maintenance cost, use Standard Oil lubricants.

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The combined facilities for research, testing and engineering behind Standard Oil Lubricants are unequalled.

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Fact:

Rugged Westinghouse Industrial Heaters available in 24 Sizes . . . 8 Coil Selections . . . 150 Ratings from 100,000 to 2,500,000 BTU/hr . . . 2,000 to 25,000 CFM each

HEAVY-DUTY COIL. Tapered steel fins bonded to 1" wrought iron pipe—with internal steam distributing pipe—solder dipped for permanent bond and corrosion resistance.

1. Proven, Westinghouse-manufactured, extended surface heating coils good for continuous operation up to 200 psig.

2. Die-formed casings with rounded corners eliminate accidents and dirt catching pockets. Front and back panels easily removable.

3. Multiple louvered outlets for efficient distribution of heated air.

4. Self-aligning, grease-lubricated ball bearings mounted outside casing, readily serviceable.

5. Face and by-pass dampers permit continuous air circulation to maintain uniform temperatures.

NOTE: Louver type mixing box accessory permits introduction of fresh air for make-up and ventilation, with or without filters.

Solve your space heating problems with Westinghouse-Sturtevant Industrial Heaters. Eliminate cold, drafty conditions caused by excessive cold infiltration through leakage or exhaust.

Two Types With Wide Applications:

GENERAL PURPOSE HEATER . . . For manufacturing areas, warehouses, garages, commercial buildings—with standard non-ferrous heating coils.

HEAVY-DUTY HEATER . . . For continuous-duty high-pressure systems, or industrial process work—with wrought iron heating coils.

The compact packaged engineering of every Westinghouse-Sturtevant Industrial Heater provides units for mounting on floor, walls, or suspended from ceilings. In short, they can be placed where they will do the most good, and can be relocated to meet any change in plant layout.

Every unit is backed with a Westinghouse exclusive—*one warranty.* Only Westinghouse makes all principal components—Fans, Heating Coils, and Motors. You can get unit engineering and single equipment responsibility.

MORE FACTS? To find out how to solve your particular heating problem, call your Westinghouse-Sturtevant Sales Engineer . . . he is the "Man With The Facts" on heating, air handling, and electronic air cleaning . . . or fill in coupon below.

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Westinghouse

J-90427

Westinghouse Electric Corp.
Sturtevant Division, Dept. 3A
Hyde Park, Boston 36, Mass.

Please send more information on your Industrial Heaters.

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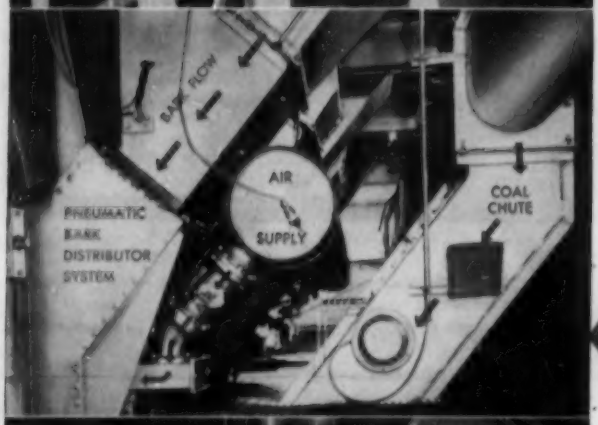
COMPANY .....

CITY ..... STATE .....



Something new in fuel burning

by RILEY

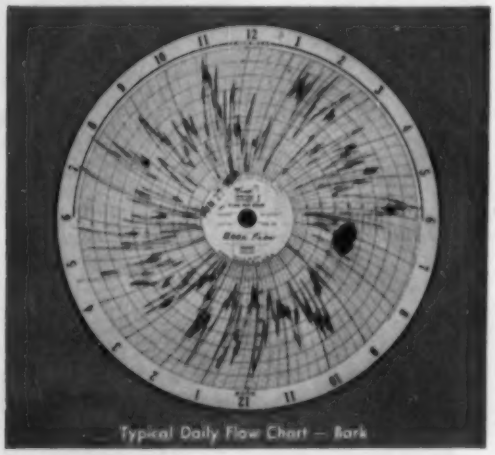
AT CHAMPION PAPER & FIBRE CO.

Canton, North Carolina

LEGEND

Illustration 1 —
Unhogged bark on last stage of bark conveyor is weighed; weight is automatically combined with coal feed rate to provide balanced combustion controls against minimum load setting (200,000 lbs/hr).

Illustration 2 —
Riley Rotating Bark Proportioner distributes bark into six chutes in a 1-4-2-5-3-6 sequence. Chutes lead to six Riley Pneumatic Bark Distributors. Distributors have no moving parts and their adjustment and maintenance requirements are minor.



Typical Daily Flow Chart — Bark

Illustration 3 —
Bark falls onto the six Pneumatic Distributor Trays where it is blasted into furnace by powerful air jets. Coal and bark burning simultaneously, give even flame distribution from front to rear of furnace.

Illustration 4 —
Coal feed is by six Riley Overthrowing Mechanical Coal Feeders. Self-lubricating Riley Hydraulic Units drive the Riley Traveling Grate at a controlled rate at any speed from zero to thirteen feet per hour. Front and rear overfire air jets provide turbulence to reduce flyash.

RILEY DESIGNS, MANUFACTURES AND INSTALLS COMPLETE STEAM GENERATING UNITS AND

unhogged BARK burns with COAL

simultaneously! efficiently!

A COMPLETE RILEY STEAM GENERATING UNIT

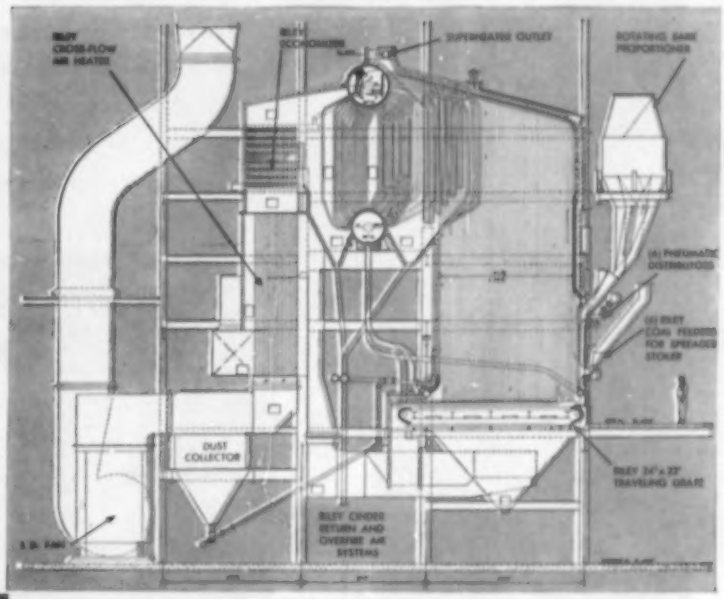
Bark and Coal Fired with Riley Traveling Grate Spreader Stoker

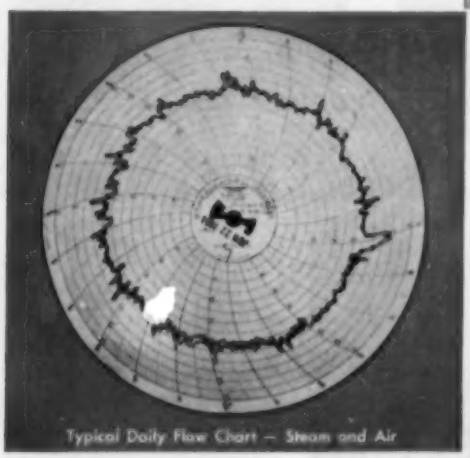
Steam Capacity — 250,000 lbs/hr 500 psig, 750F.

featuring

- **Riley Rotating Bark Proportioner**
- **Riley Pneumatic Bark Distributors**
- **Riley Overthrowing Coal Feeders**
- **Riley Traveling Grate (24'x22')**
- **Riley Hydraulic Drives**
- **Riley Cross-flow Air Heater**
- **Riley Cinder Return and Overfire Air Systems**
- **Riley Continuous Tube Economizer**

a completely integrated Riley Unit





Typical Daily Flow Chart — Steam and Air

This completely integrated Riley Steam Generating Unit at Champion Paper and Fibre Company, Canton, N. C. gives to the pulp and paper industry, and to others with refuse wood and cellulose burning problems, an entirely new technique in the science of fuel burning. Bark and coal can be burned alone or together in variable proportions under complete automatic control. New methods used at Canton permit efficient utilization of an extremely variable bark supply direct from barking drums, thus avoiding an expensive hogging and storage system.

For a complete description of this installation write for your copy of a paper prepared for TAPPI by Harold Hansen, Power Engineer, The Champion Paper and Fibre Company, and L. P. Copian, Service Engineer, Riley Stoker Corporation. Address Department A, Riley Stoker Corporation, Worcester, Mass.

A survey of your plant by a consulting engineer could show ways of making surprising savings in your power costs.

RILEY

Stoker Corporation

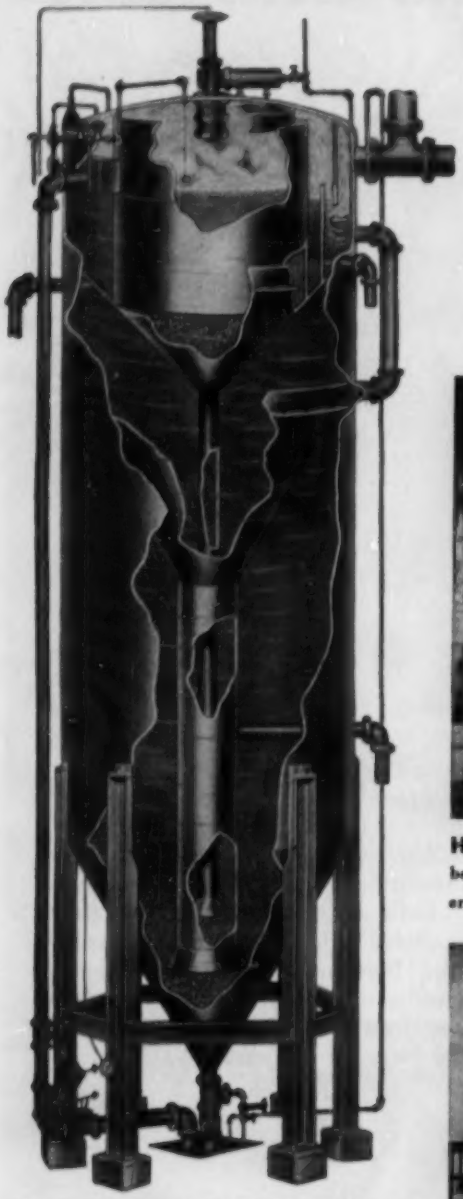
WORCESTER, MASSACHUSETTS

Boston, New York, Philadelphia, Buffalo, Washington, Pittsburgh, Cleveland, Detroit, Chicago, Cincinnati, Charlotte, New Orleans, Atlanta, St. Louis, Kansas City, St. Paul, Tulsa, Houston, Denver, Salt Lake City, Los Angeles, San Francisco, Portland, Seattle.

FUEL BURNING EQUIPMENT FOR PUBLIC UTILITY AND INDUSTRIAL POWER AND HEATING PLANTS

In Hot Process Softening, too

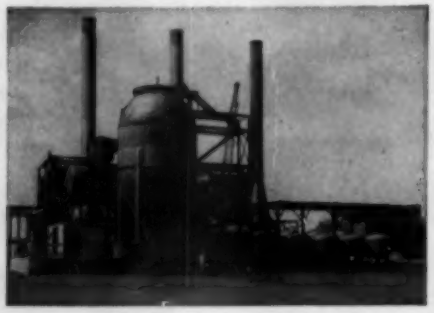
BELCO Builds a Complete Line-



Belco-designed equipment provides high operating efficiency at low operating costs. Many of the country's largest industries rely on Belco for their water conditioning equipment. For example, Belco has built the largest fully automatic demineralization plant in the world and is currently furnishing one of the largest hot lime zeolite installations. A consultation with Belco could lead to lower operating costs for you, too. Write or call for technical assistance at any time.

HOT LIME SODA — Installation in boiler house at large eastern oil refinery. Has capacity of 200,000 lbs/hr.

HOT LIME SODA — Installation in large southwestern utility. One of three units with 90,000 lbs/hr total capacity.



HOT LIME BELCOLITE — Installation at large southern chemical company. Capacity 600,000 lbs/hr. This plant embodies "thoroughfare" operation of separate deaerator and hot process tank. The large hot process tank was designed, built and erected by Belco under its contract with customer.

Illustrated literature "Belco In Pictures" is available on request. Write for copy, today.

Belco

Processes for Removal of Water Impurities

Boiler Feedwater Heaters • Water Softeners • Filters • Clarators Demineralizers • Automatic Process Control Panels

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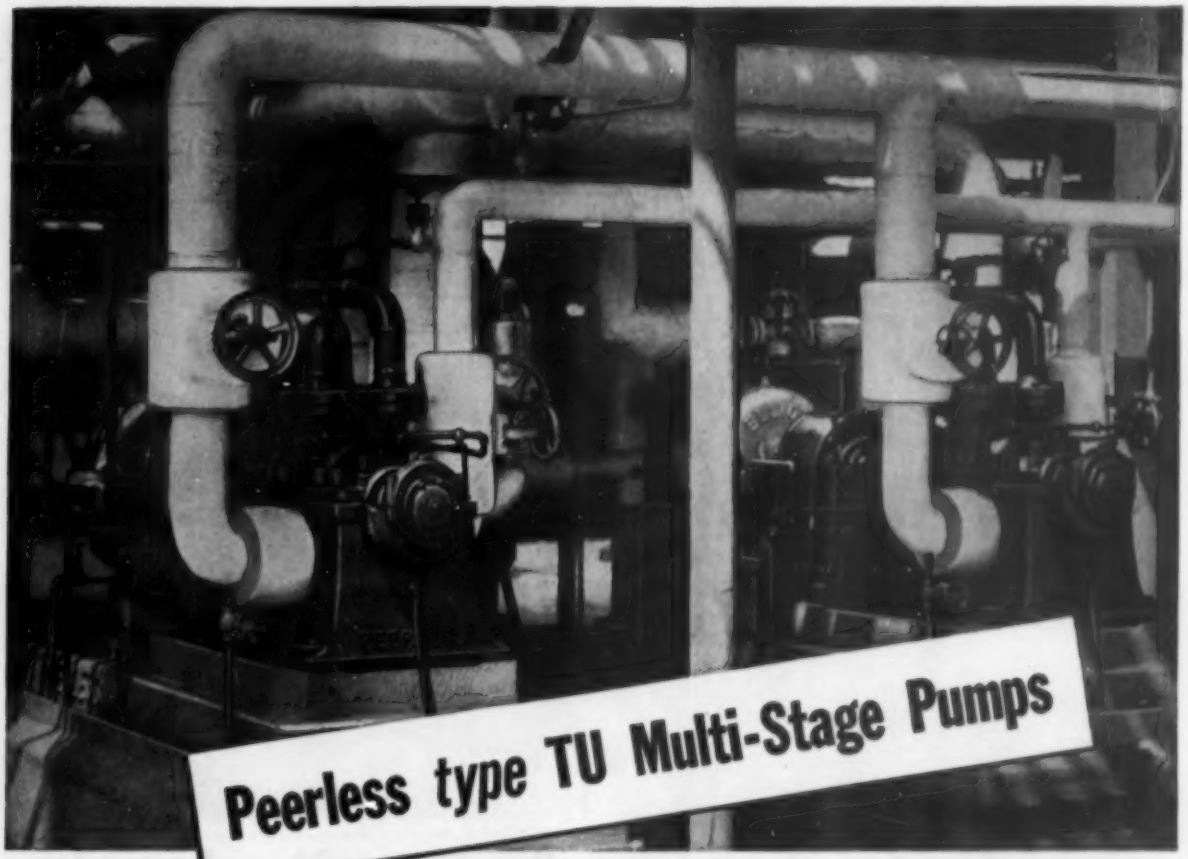
BELCO DESIGNS ENGINEERS & FABRICATES WATER PROCESSING EQUIPMENT



Peerless type TU Multi-Stage Pumps

PEERLESS PUMPS

GENERAL SPECIFICATIONS

HEADS	Up to 1600 Feet
CAPACITIES	Up to 3000 GPM
TEMPERATURES	Up to 300°F
CASE PRESSURES	Up to 800 Lbs.
HP RANGE	Up to 325 BHP
DRIVES	All Types
CONSTRUCTION	Cast Iron, Bronze, Stainless

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION

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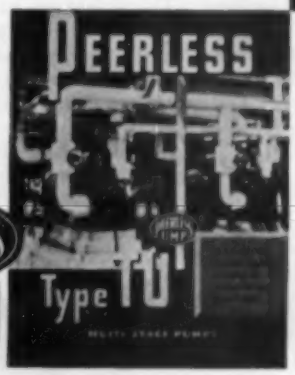
Distributors in Principal Cities; Consult your Telephone Directory

4 COST-SAVING FEATURES OF THE TYPE TU LINE

- *SIMPLICITY IN DESIGN*
- *GOOD HYDRAULIC CHARACTERISTICS*
- *DURABLE, RUGGED CONSTRUCTION*
- *ON-THE-JOB DEPENDABILITY*



2, 3, 4 AND 5-STAGE PUMPS FOR SUPPLYING CIRCULATING AND BOOSTING WATER AND PROCESS LIQUIDS AGAINST MEDIUM AND HIGH HEADS. Put these dependable pumps to work for you. They'll deliver high maintained efficiencies over an extended service life. Their split-case design makes them easy to service and maintain. Their precision construction guarantees year after year durability. In all sizes 4" and under, cross over between stages is built integral with upper pump case. Over-size shafts, wear rings, shaft sleeves, heavy duty ball bearings, modern case and impeller design are outstanding features. Choose from many types and sizes for all head and capacity requirements.

PROFUSELY ILLUSTRATED BULLETIN. A new 4-color bulletin describes the Peerless Type TU pumps. It's complete with pump cross-section, dimensional drawings and load-capacity data. Use coupon below.

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Food Machinery and Chemical Corporation
301 West Avenue 26, Los Angeles 31, California

Please send a copy of TU Pump Bulletin No. B-1400 to:

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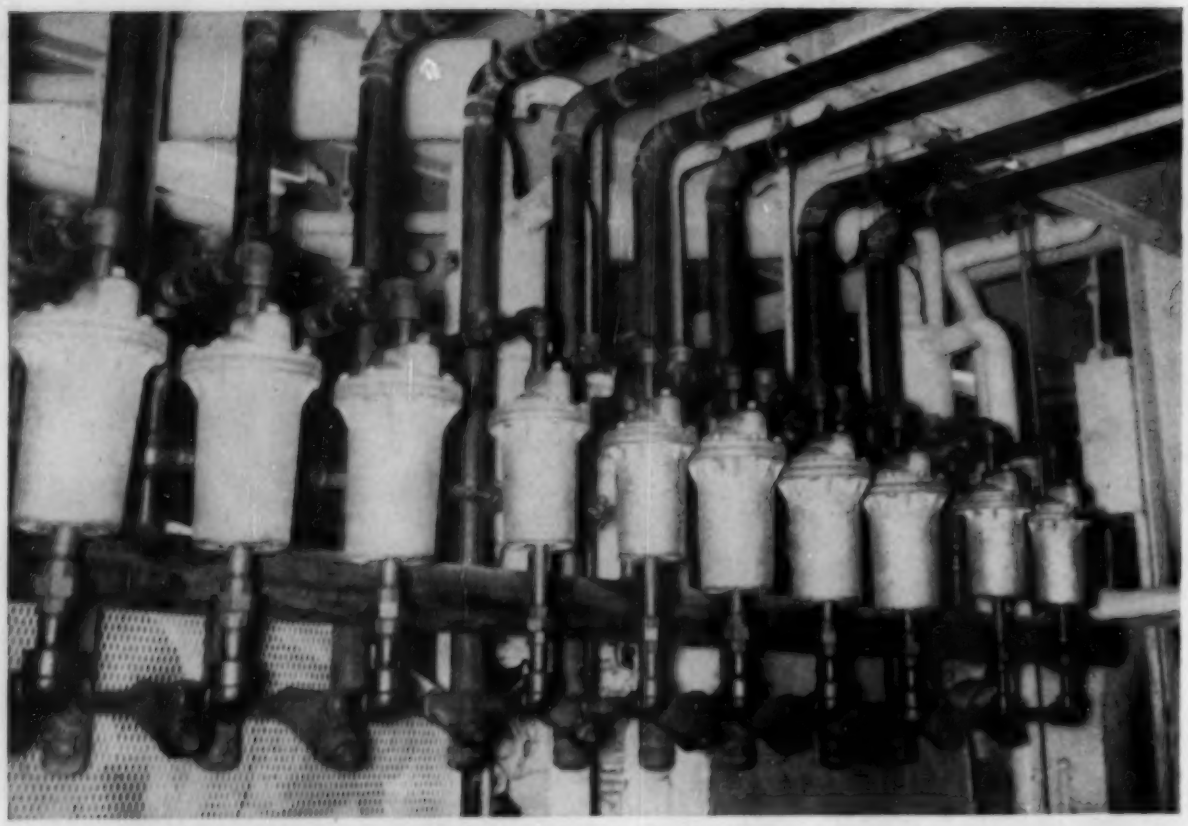
S.P.I.



Tip on Choosing Steam Traps: Run Tests with a Pyrometer

Bottom inlet-top outlet traps in six sizes, ½" to 2" connections; 950 to 20,000 lbs/hr capacity.

Side inlet-side outlet traps in five sizes, ½" to 1¼" connections; 680 to 6700 lbs/hr capacity.

Integral strainer traps in three sizes, ½" and ¾". Cost less than trap and separate strainer, save fittings and labor.

A common problem—Traps on Rogers spray driers at Rochester Dairy Company, Rochester, Minn., required frequent servicing—used up about two months of one man's time annually. And, then, within about 30 days after trap servicing, drier temperatures would be 100 degrees below steam temperature. Nobody has to put up with such trap troubles!

Take a tip from this solution!—Henry T. Maass, Building and Utility Supt., took action. He ran extensive pyrometer tests on his driers, using different makes of traps.

100° hotter!—The driers are now equipped with Armstrong inverted bucket steam traps. Temperatures correspond to steam pressure—100 degrees hotter than before. Maintenance?—negligible. Rochester carries $63.31 of Armstrong trap parts in maintenance store against $873.52 in parts for another make of traps that haven't been replaced yet.

Moral—A small investment in Armstrong steam traps can make a world of difference in performance of production equipment and in cost of maintenance. Call your local Armstrong Representative, he has the products and the experience and the ability to be of real assistance.

FREE CATALOG

The 44-page Steam Trap Book is "the handbook of steam-trapping". Selection, installation, maintenance, capacities, data, prices, tables, charts, useful material—yours for the asking without any obligation. Also see data in Sweets or Chemical Engineering Catalog.

Armstrong Machine Works
806 Maple Street, Three Rivers, Michigan

Application Engineered
ARMSTRONG STEAM TRAPS

Again ORR & SEMBOWER Leads...

PAY as you SAVE

PACKAGED STEAM

RIGHT NOW is the time to get all the operating advantages of O&S *Powermaster*® Packaged Automatic Boilers *without* high capital investment. Pioneers in the packaged steam field, O&S now offers a new extended payment purchase plan that gives you more and more savings.

HERE'S HOW YOU SAVE:

- Save on fuel and time through real operating efficiency with a *new* packaged steam plan.
- Save on down-time and maintenance expense.
- Save on taxes if your existing boiler cost has been completely amortized. This saving is especially important with the "sum of the digits" method of figuring depreciation provided in the new tax law.
- Save on fuel costs because you can instantly change from gas to oils of any grade to meet delivery or economic conditions.
- Save on space by *Powermaster's* extra-compact design.
- Save on initial investment because you can get *exactly* the size and capacity boiler required for your needs. *Powermaster* is available in a full range of sizes from 15 to 500 hp., 15 to 250 psi. steam or hot water.
- Save on installation costs and time because a *Powermaster* "goes in" anywhere quickly, easily.

WHAT'S MORE—all these savings of direct costs, indirect costs and labor can be yours with little cash outlay. It's true—*Powermaster* virtually pays for itself from savings. Learn more about *Powermaster* and the new Orr & Sembower extended payment plan—write today to Orr & Sembower, Inc., Morgantown Road, Reading, Pa.

Powermaster is your best bet because only O&S offers you undivided responsibility for every package. All components are made in the O&S factory—are guaranteed by Orr & Sembower, backed by more than 85 years reputation.

ORR & SEMBOWER

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PACKAGED AUTOMATIC BOILERS

In sizes to 500 HP; pressures to 250 psi.

What it takes to make a 3000 Degree Refractory Concrete

Because of the widespread interest in the use of refractory castables, many furnace operators have asked us for the story behind the performance of B&W's unique refractory concrete, Kaocast.

Here are the answers to some of the most frequently asked questions:

Q. *When you refer to Kaocast as a 3000 degree refractory castable, do you mean that its melting point is 3000° F?*

A. No, this means that its service use limit is 3000° F; its melting point is 200 degrees higher.

Q. *Just what does it take to make a 3000 degree refractory castable like B&W Kaocast?*

A. Let's first define a few terms. Refractory castables are made with granular materials which are volume stable at high temperatures and which can undergo repeated heating and cooling cycles without disintegration. These materials, known as refractory calcines or grogs, are blended with suitable hydraulic binders. The initial strength of a refractory castable is thus developed in the same manner as that of ordinary concrete—that is, through the chemical action between water and the binder. A strong *ceramic bond* is formed when the refractory castable is subjected to temperatures above the vitrification point.

Q. *Then you have a grog, a binder and a method of putting them together. Which is most important?*

A. You can't say that any *one* is most important. It's a combination of all three. Let's take them one at a time. Our grog consists primarily of the proper blend of kaolin and other alumina-silica materials. This ratio enables us to achieve a grog with minimum expansion and shrinkage, a high fusion point, and greater stability under load, at varying temperatures.

Q. *And now, what about the binder?*

A. There are a number of factors responsible for the success of the Kaocast binder. One is the compound Tricalcium Penta-aluminate (3 lime to 5 alumina). This formula produces the most refractory compound (highest melting point) that can be made from lime and alumina. Another is that by using the purest commercially available lime and alumina, the Kaocast binder is substantially free of iron and silica. Such traces of these that are present combine during the prefiring of the binder to produce stable compounds.

Q. *Just how important is the manufacturing or "blending" of the grog and the binder?*

A. If one factor could be singled out as "most important" it would be quality control.

Direct control over the fineness of materials, prefiring temperatures, and other phases of manufacture is possible at B&W because both the grog and the binder are made and blended at B&W's Augusta Works—under B&W's direct control and supervision.

Q. *These factors you've discussed must add up to some specific advantages of Kaocast. What are they?*

A. B&W Kaocast has all the advantages of easy installation which are responsible for the widespread interest in refractory concretes, plus these exclusive features: It is the only 3000 degree refractory concrete with high resistance to spalling and low volume change throughout its operating range.

THE BABCOCK & WILCOX CO.
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga.

GREAT THINGS FOR GREAT NORTHERN . . .

At East Millinocket, Maine, on the West Branch of the Penobscot River, Great Northern Paper Company has completed the first phase of a significant expansion.

The expansion includes a Chemi-Groundwood Pulp Mill for processing hardwood, the first large scale commercial plant of its kind.

Further additions are a woodyard employing advanced handling and sorting methods, new wood and grinder facilities, alterations to the screening processes, two additional paper-making machines capable of operating at 2,500 feet per minute, a new power plant and all related facilities.

Stone & Webster Engineering Corporation was retained for all construction and for the design and engineering of the Chemi-Groundwood Pulp Mill and the Power Plant.

Write or call us for information as to how our experience may be of assistance to you.

The installed capacity of Great Northern Paper Company's newly-expanded mill at East Millinocket, Maine, will be 1,000 tons of newsprint per day.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY *of* STONE & WEBSTER, INC.

New York Boston Chicago Pittsburgh Houston San Francisco Los Angeles Seattle Toronto

WALWORTH

WALSEAL® VALVES AND FITTINGS

Cutaway view of a Walseal Tee showing: factory-inserted ring of silver brazing alloy; fillet of silver brazing alloy that appears upon completion of Walseal joint; cutaway view of the completed joint showing that silver brazing alloy has flowed in both directions from the factory-inserted ring.

Better because . . . **There's no guesswork when a silver-brazed joint is made with a Walseal fitting. Sil-Fos alloy, which appears as a fillet at the face of a Walseal joint, comes from rings which have been factory-inserted in the end connections of Walseal fittings. The bright silver alloy fillet that you can see assures full penetration of alloy for a permanently leakproof joint.**

Walseal is a registered trade mark identifying bronze valves and fittings manufactured by the Walworth Company. Walseal products have factory-inserted rings of silver brazing alloy in threadless ports. Walseal joints can be made only with Walseal valves and fittings.

If you're piping water, oil, steam, air, oxygen, nitrogen, helium or other industrial gases or refrigerants through brass, copper, or copper-nickel pipe, you'll want to investigate Walseal – available in complete lines of bronze valves and fittings in four distinct pressure ranges – from 0 to 5000 psi. working pressure*. Your copy of Circular 115 will be sent on request . . . see your near-by Walworth Distributor today, or write to: Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.

*Walseal fittings and valves are being used at sub-zero temperatures as low as —350 F.

Make it "a one-piece pipeline" with WALSEAL

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valves . . . pipe fittings . . . pipe wrenches

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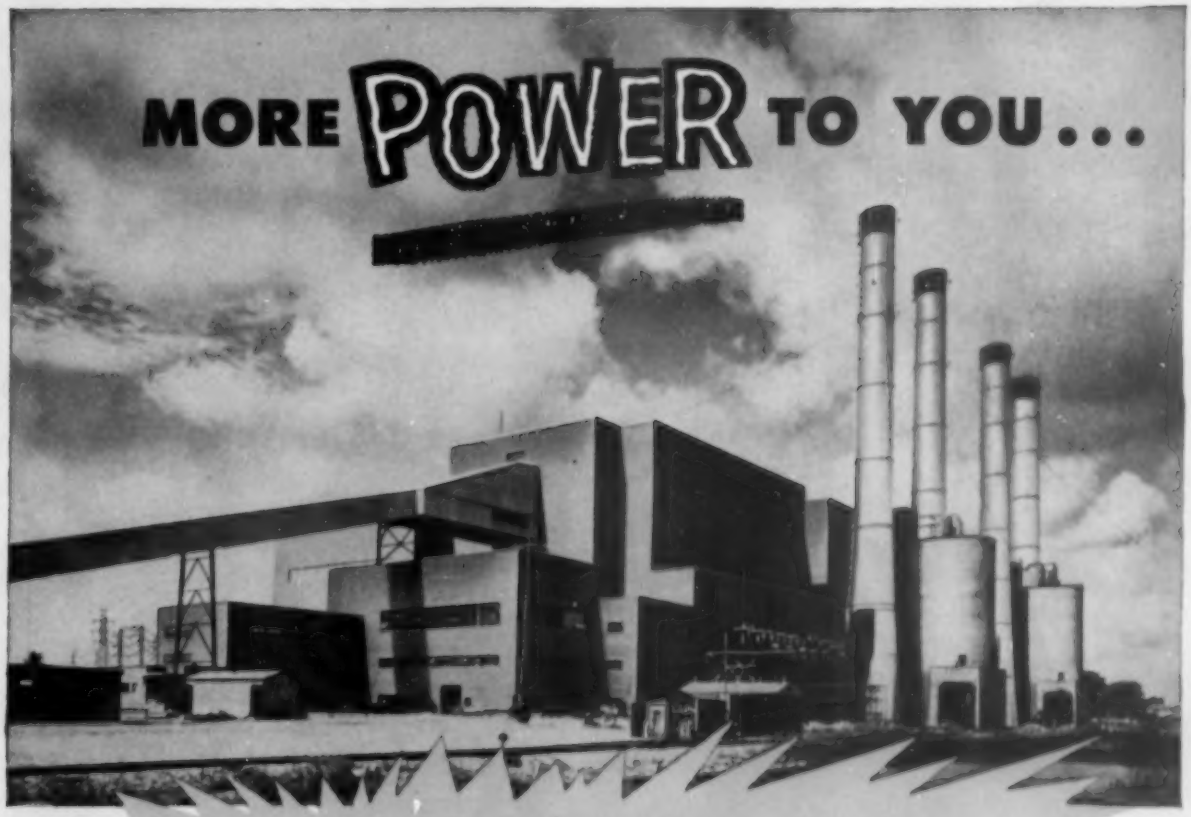
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



Detroit Edison Plant boosts U.S. Electrical Capacity to 100,000,000 KW.

Detroit Edison's St. Clair plant boosts U. S. generating capacity to a new high. The last St. Clair unit, rated at 156,250 kw., to go on the line brought the total U. S. electrical capacity to over 100 million kw. Shell Turbo Oil 27 was purchased as the lubricant for this unit as well as for the other three turbine generators in this plant.

Shell Oil Company extends heartiest congratulations to Detroit Edison Company for their part in achieving this industry milestone in electrical power.

Shell is proud of its long association with the great electrical industry.

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
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SHELL

Meet the man you can call with confidence to solve your thermal insulation problems

To insulate outdoor tanks with complete weather protection, these skilled J-M applicators follow a specification developed by Johns-Manville. Here they are fastening J-M Asbestocite® Sheets over J-M Zerolite® Insulation. J-M 85% Magnesia Insulation is also widely used for this type of equipment

He is your J-M Insulation Contractor... the man with the world's most complete insulation engineering service

"Insulation is no better than the man who applies it." Today, with rising fuel and maintenance costs, it is especially important to place your insulation job in skilled hands. The scientific application of J-M quality insulations by J-M Insulation Contractors will assure you of the maximum return on your insulation investment for years to come. Moreover, you get undivided responsibility for *all* your insulation requirements.

1. You get dependable materials—Johns-Manville manufactures a complete line of insulations for every service temperature from minus 400F to plus 3000F. From them your J-M Insulation Contractor can select the right insulation for the most dependable service on your job. To develop new and improved insulation materials Johns-Manville maintains the J-M Research Center—largest laboratory of its kind in the world.

2. You get dependable engineering—For 95 years Johns-Manville has been accumulating insulation engineering experience. J-M Insulation Engineers are called upon to solve insulation problems of every type and magnitude, in every industry. Since your J-M Insulation Contractor works closely with J-M Insulation Engineers, he brings to *every* job a high degree of training, skill and experience.

3. You get dependable application—Johns-Manville has set up a nationwide organization of J-M Insulation Contractors to serve you. These Contractors maintain staffs of insulation engineers as well as skilled mechanics thoroughly trained in J-M's proved application methods. You can have absolute confidence in their ability to apply J-M insulations correctly for trouble-free performance.

For further information and the name of your J-M Insulation Contractor, write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ont.

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Johns-Manville *FIRST IN* INSULATION

MATERIALS · ENGINEERING · APPLICATION

She tests her purchases **Do you?**

If you are the average cooling tower owner, you do not test your purchase. In fact, Mr. Average Owner knows less about the actual performance of his cooling tower than his wife does about the interior of the melon to which she has applied the "squeeze and sniff" test. True, cooling towers are purchased for a specified performance; but the difference between "specified" and "actual" is sometimes astounding and only a test will tell.

"Test Your Tower," a new Marley technical publication, outlines a simplified straight-line method by which you can test your industrial cooling tower and arrive at positive results. By applying this test you *know* whether or not your "guaranteed" tower does the job it was specified for.

You can test your tower under any normal operating condition, and the Marley method of analysis will give you an accurate, conclusive comparison with guaranteed performance. Fill in the coupon, get your copy of "Test Your Tower" . . . then test it. Your Marley engineering service representative in major cities can also supply this brochure, just call him.

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Two Terry Turbines equipped with "trouble eliminators"

Because these turbines have solid wheels, they can take a lot of abuse, without complaint. Here's why:

1. The wheel has no separate parts to become loose or work out. It is a single forging, in which a series of semi-circular buckets is milled.

2. Blade wear is of little consequence because the power-producing action of the steam takes place on the curved surfaces at the back of the buckets. Wear does not materially affect horsepower or efficiency.

3. The blades cannot foul. There is a one inch clearance on either side of the wheel and, in addition, the blades are double rim protected. There is no need for close axial blade clearance, because the steam enters the buckets in a direction at right angles to the shaft.

For complete details of these *work horses of industry*, send for a copy of bulletin S-116. No cost or obligation.

THE TERRY STEAM TURBINE CO.

TERRY SQUARE, HARTFORD 1, CONN.

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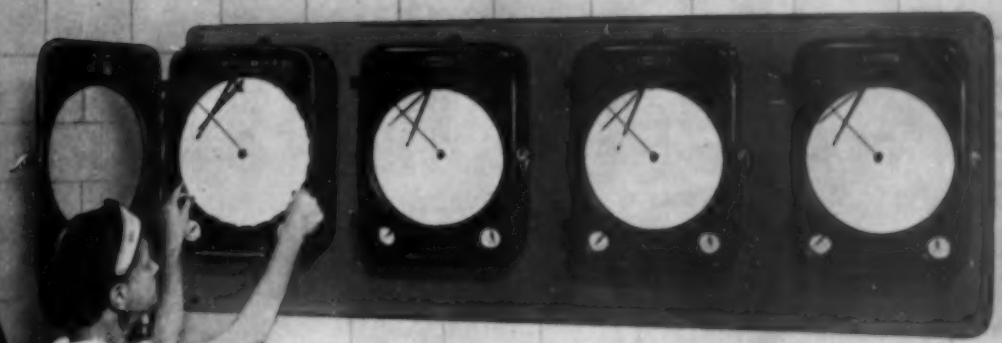
TT-1179

BLUE PLATE FOODS, Inc.

SHOW PLANT IN NEW ORLEANS, LA.

Gets UNIFORM Quality Products and Increased Plant Efficiency with POWERS Automatic Temperature Control



POWERS Recording Controllers at left prevent overheating and eliminate boilover of jellies and preserves processed in steam jacketed kettles used in this modern plant.

Exact Control of Heat Exchanger which maintains vegetable oils at proper temperature is regulated by a Powers No. 26 Regulator controlling both inlet and outlet valves on heating and cooling water.

POWERS CONTROL

If UNIFORM Quality of Your Product

is dependent upon exact control of TEMPERATURE or HUMIDITY use Powers automatic control. It often pays back its cost many times a year. An experienced Powers engineer will gladly help you with your control problem. Contact our nearest office or write us direct.

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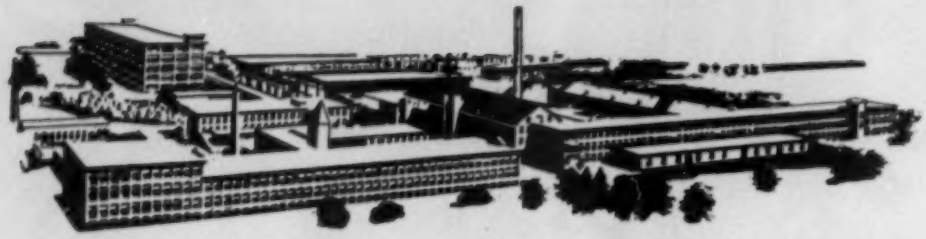
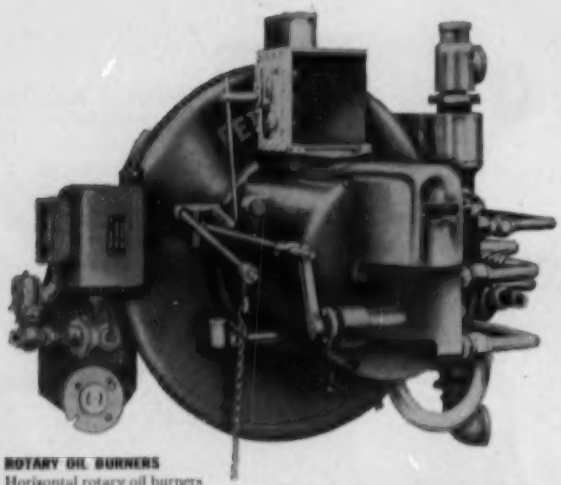
Established in 1891 · **THE POWERS REGULATOR CO.** Skokie, Ill. • Offices in 60 Cities



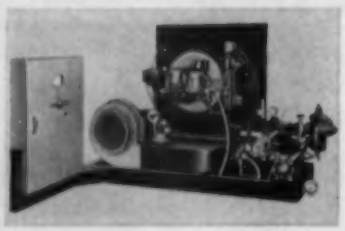
DAVIS & FURBER MACHINE COMPANY, NORTH ANDOVER, MASS.

SAVED $12,000

on fuel the first year with



ROTARY OIL BURNERS
Horizontal rotary oil burners make possible substantial fuel savings by burning the low-cost heavy fuel oils with complete dependability. Models for every industrial need. Capacities up to 600 boiler horsepower.



COMPLETE PACKAGED UNIT
A complete forced draft combustion system with all parts factory-assembled and tested. Saves installation time and cost, gives top performance and fuel economy.

PETRO

T. M. REG. U. S. PAT. OFF.

INDUSTRIAL OIL BURNERS

"The changeover to Petro oil firing paid for itself the first year," says Forbes Rockwell of Davis & Furber

PETRO oil burners do *two* jobs in this huge plant. They produce steam for heat and generate the electric power for plant operation. "We consider it nothing short of a minor miracle the way your dealer's engineering department came in here and changed us over to oil in the middle of winter without causing us to curtail the least bit in either power or heat," says Mr. Rockwell. Petro oil burners can save money for you too.

PETRO preheats oil for steady, sure firing

Cold oil is sluggish, starts slowly, and burns irregularly so the makers of Petro adopted the "thermal viscosity principle" of *preheating oil* to an efficient temperature before it is injected into the firebox. This makes possible fast starting, steady firing, and lower fuel costs.

PETRO burns lower cost fuel with complete reliability

The pre-heating of oil enables Petro owners to burn the heavy fuel oils (Nos. 5 and 6), which average 8% richer in heat value than light burner oils, and cost less per gallon. Petro burners are completely automatic, and accurately take care of fluctuating load requirements.

PETRO is adaptable to any boiler room

Petro industrial oil burners are designed and built to *modernize* the firing of your present boilers. The flame is adjustable to any firebox, and the installation is adaptable to any boiler room layout. This means that you save substantially on initial installation costs, and more money every day on fuel and labor costs. Mail coupon or write for free catalog and information.

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POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

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POWELL VALVES THE COMPLETE QUALITY LINE

FIG. 1503—W.E. 150-Pound Cast Steel Gate Valve

FIG. 19084—900-Pound Pressure Seal Non-Return Globe Valve, Gear Operated

FIG. 11365—Cast Steel Pressure Seal Horizontal Lift Check Valve for 1500 Pounds W.S.P.

FIG. 3031—W.E. Cast Steel Globe Valve for 300 Pounds W.S.P.

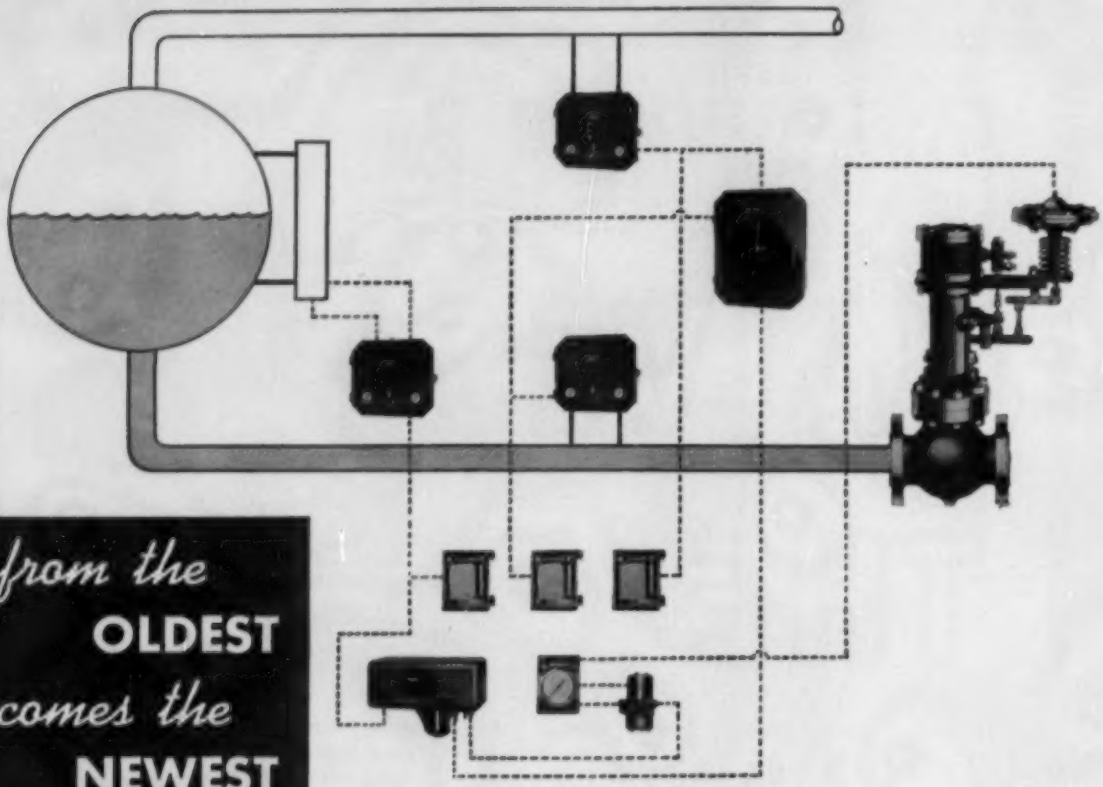
POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

Investigate the many outstanding features of the High Pressure Boiler Non-Return Valve shown above (Fig. 19084). And be sure to find out about the *complete* line of Powell Valves —*quality* valves that will give you dependable flow control.

The valves shown above are examples of the many types of precision-built valves that carry the Powell name and measure up to the Powell standards of quality.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about our complete line, and help solve any flow control problem you may have. Write . . .

The Wm. Powell Company, Cincinnati 22, Ohio . . . . . 109th year



from the **OLDEST** *comes the* **NEWEST**

IN THREE-INFLUENCE BOILER FEED WATER CONTROL

Type 3-L with instrumentation by Taylor

COPES . . . the oldest name in boiler feed water regulation . . . now offers you the newest in three-influence feed water control. Combined in the new COPES Type 3-L are . . .

. . . the scientific balance, characterized ports and rugged dependability of the COPES control valve.

. . . plus the unequalled responsiveness and accuracy of *instrumentation by Taylor.*

And Copes-Vulcan assumes undivided responsibility for service, whenever or wherever needed . . . throughout the life of the installation.

Write for Bulletin 1013. It tells the story of the newest feed water control to come from COPES . . . the oldest name in boiler feed water regulation.

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CONTINENTAL FOUNDRY & MACHINE COMPANY
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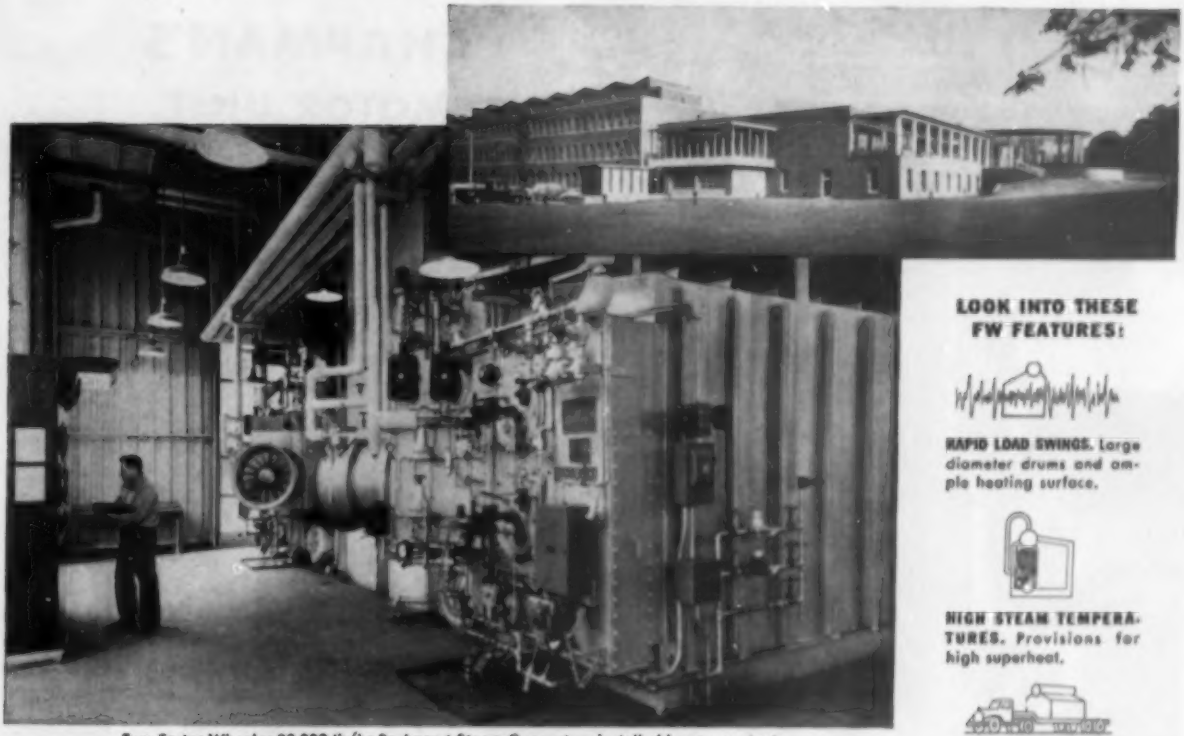
COPES VULCAN

BOILER CONTROL

Three-influence mechanically-operated and three-influence electrically-operated regulators are also available.

WITH INSTRUMENTATION BY *Taylor*

two FW packaged steam generators add up to LOW POWER-PLANT COSTS at new IBM laboratory



Two Foster Wheeler 22,000 lb/hr Packaged Steam Generators installed in power plant of new IBM research laboratory at Poughkeepsie, N. Y.

International Business Machines Corporation's new research laboratory at Poughkeepsie, N. Y. is designed for maximum efficiency and dependability of all building services. For low power-plant costs two Foster Wheeler packaged steam generators were chosen.

On actual test, each of these new boilers has produced in excess of the guaranteed capacity of 22,000 lb of steam per hour at 125 psig operating pressure. They will supply the heating load for the entire building, as well as power for the steam-turbine-driven refrigeration plant.

Compared to conventional boiler construction, these standard-design, plant-assembled water tube steam generators effect substantial savings in power plant costs. The high efficiency and easy accessibility of the Foster Wheeler design contribute to low operating and maintenance costs, thus, as in this installation, justifying the use of multiple units.

Foster Wheeler Packaged Steam Generators are available in capacities up to 45,000 lb of steam per hour; final steam temperatures to 825 F; pressures to 900 psig. For complete information, write to *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

LOOK INTO THESE FW FEATURES:

RAPID LOAD SWINGS. Large diameter drums and ample heating surface.

HIGH STEAM TEMPERATURES. Provisions for high superheat.

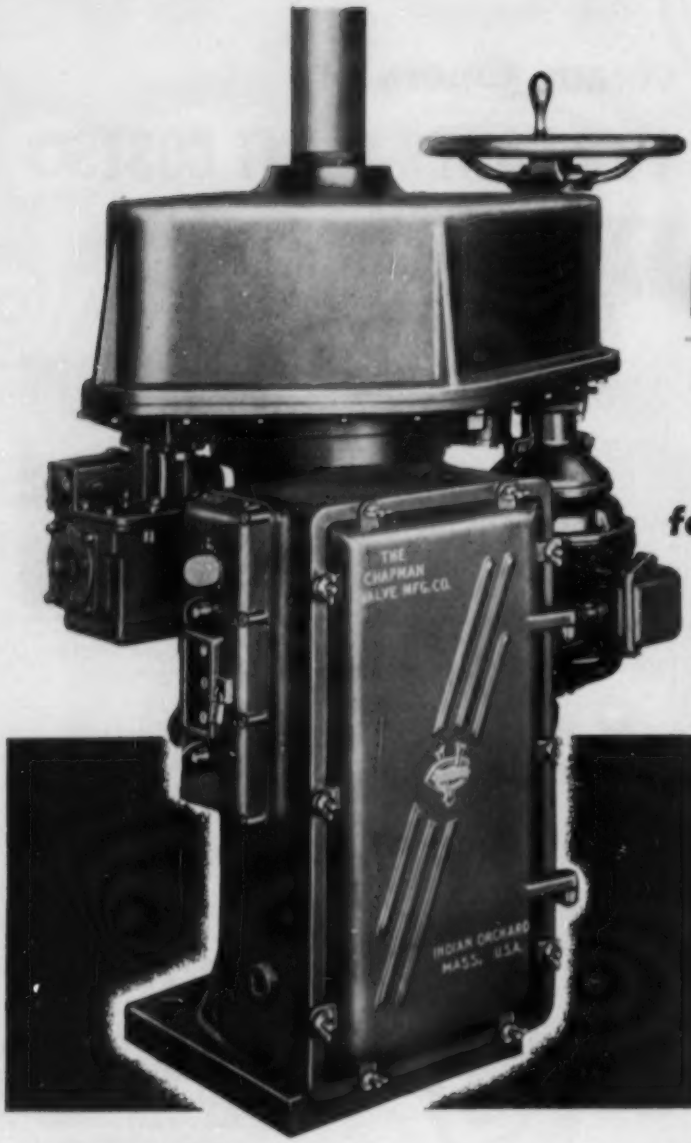
ADAPTABILITY. Easily moved. Require only a slab foundation — permit outdoor installation.

ECONOMIZERS. Package economizers available to increase capacity and minimize fuel cost.

ACCESSIBILITY. For inspection, cleaning and maintenance.

CLEAN HEATING SURFACES. Soot blowers incorporated . . . cleaning without boiler shutdown.

FOSTER WHEELER



Simple and RUGGED...

CHAPMAN'S MOTOR UNIT

for Valves, Floorstands and Sluice Gates

Floorstand equipped with Motor Unit . . . control panel, motor, limit switch and push button station.

Simple, durable mechanism of Chapman's Motor Unit. Handwheel remains stationary during motor operation.

Chapman Motor Units have fewer components than any other units, providing greater dependability, much lower maintenance costs.

There are only two pinions and two gears in the motor reduction train: drift is eliminated and lash is negligible. Your valves seat tight, but not too tight. Operation is *always* smooth and trouble-free.

You can mount the Chapman Motor Unit in any position, at any angle required. The rugged stub-tooth gears require no grease or oil bath . . . yet run smoothly, quietly, with minimum wear.

Weatherproof and steam tight, Chapman's floorstand units are shipped completely wired, ready to connect to your power leads, for easy, rapid installation. This modern motor unit is dependable and economical. Send for *new* catalog No. 51.

The CHAPMAN Valve Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

TRAINING TARGET—Wisdom in the Use of Authority

THE CHALLENGE is great. If management fails to create an industrial environment that enables people to gain appropriate satisfactions, employees will turn elsewhere for leadership. They will turn to those who seem to offer greater hope of providing a means of satisfying their needs.

The following comments on this challenge are adapted from an address by W. M. McFeely, vice president and director of industrial relations, Riegel Textile Corp. and Riegel Paper Corp., before the recent American Management Association meeting in Atlanta, Georgia.

Mr. McFeely emphasized that training supervisors to meet today's leadership challenges requires more than equipping them with a series of rules for handling specific situations. The training job is larger than that and, unfortunately, more complex. Our training objectives must be related to the kinds of satisfactions people look for in their jobs, and, thus enable supervision to see the whole field of forces that influence employee reaction to leadership.

To be more specific, experience and research indicate that people want five kinds of satisfaction in their work.

The first of these is the satisfaction that comes from **actual job performance,** that is, showing what they can do when they are given an opportunity to do the things they like to do and can do well.

The second is the satisfaction that comes from being an **accepted member of the face-to-face group** which they contact in their day-to-day work.

The third is the satisfaction that comes from being a member of an organization that **performs socially useful services** which have gained for the organization and its employees acceptance and status in the community.

The fourth is the satisfaction that comes from **working with a competent supervisor** who likes to work "with" rather than "over" and who will anticipate and move toward relinquishment of authority to the extent that it is no longer needed.

The fifth is the satisfaction that comes from the **rewards system of the organization.** Here money is important because of its versatility as a means of satisfying physical, social, and psychological needs. Herein also lies the truth of the statement that man does not live by bread alone. Of great importance is the satisfaction that comes from mobility within the organization and the sense of validity and achievement associated with personal recognition, promotion, and more responsibility.

There is no fixed relation among these five classes of satisfaction. Any given individual will emphasize one over another. But, the important thing is that **every individual experiences some need for all five satisfactions.** Supervisory training, therefore, must be directed toward an understanding of the things that contribute to these satisfactions and the kind of leadership that enables people to achieve them.

Authority — the Focal Point

Success or failure will be determined by management's wisdom in the use of its authority more than by any other single factor. Most of the glaring failures and tragedies in human history have been those of power wrongly used. They are written by those who have used power to exploit, suppress, belittle, to deny rather than promote healthy participation.

However, we often fail to recognize this fact when we appraise the effectiveness of our training activities. We know that the organization structure of industry is cast in the historical, troublesome pattern whereby some have power over others. This is not wrong any more than genuine strength and legitimate authority are wrong elsewhere in our society. It is a situation that calls for wise and delicate handling.

Everyone in a position of authority creates an emotional atmosphere as well as situations that either provide a challenge to, or place restrictions upon the self-development of others and the degree to which they can attain satisfactions in their work. They create the "psychological air" that others breathe. If the air they breathe assures them that they will be accepted with all of their limitations, and be given constructive guidance, they will "ache with renovation." They will respond to such leadership with enthusiasm, confident of self fulfillment. If the air they breathe allows them to draw only the shallow, nervous inhalations of fear, they will seek in others a leadership that can restore their self-esteem.

Wisdom in the use of authority is one of the surest ways to win the battle for the loyalties of men. It must be a constant training target.

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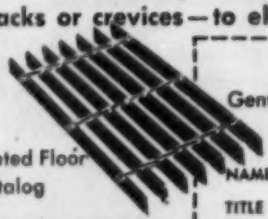

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INDUSTRY SPEAKS

SOUTHERN POWER AND INDUSTRY

The Temperature Barrier is Still Present

Adapted from comments by **Theodore Baumeister** at the recent **National Exposition of Power and Mechanical Engineering.** Mr. Baumeister is Professor of Mechanical Engineering, Columbia University, and Consulting Engineer for General Public Utilities Corporation.

OVER the years, the power industry has met the challenge of economics, as posed by a rising price trend in equipment, fuel and labor, by resort to increased size, higher pressures, higher temperatures, greater use of reheat, higher boiler efficiencies, more regenerative feed heating, etc. These improvements have all been of the kind which represent refinements of existing practices. There has been little which can be classified as revolutionary or epochmaking.

By the accumulation of many small betterment factors we have been able to keep ahead of the deluge of rising prices all about us. We are able to deliver a kilowatt-hour today for less money than we could twenty-five years ago—and without the benefit of government subsidy.

Since World War I there have been three contributions which stand out in this attempt to meet the exigencies of the situation in the generation of electric power. First was **the principle of regenerative feed heating by extraction of steam from the turbine.** This not only effected a great saving in fuel but opened the way for the construction of much larger turbines by freeing the exhaust end of much of its capacity limitation.

The second contribution, which allowed the development of large furnaces with heat release rates ranging to 2 billion Btu per hour in present practice, was **the means whereby coal,** like oil or gas, **could be burned in suspension and/or in a continuous stream.** This step led to the pulverized coal firing and cyclone furnace designs with the practical removal of the upper limit of size when utilizing our most plentiful fuel-coal.

The third big step forward is represented by the plant recently announced for the Philadelphia area which, like the previously projected plant in Ohio, **breaks through the barrier of the critical pressure region** and completely revolutionizes our thinking and our practice, not only on boilers and turbines, but also on all associated components such as feed pumps, feed pump drives, feed pump speeds, condenser leakage, feedwater purity, steam purity, feed water heaters, instrumentation and controls, all under emergency conditions as well as normal conditions of operation.

This supercritical pressure cycle enables us to use our present structural materials to the limit of their capacity. The barrier of temperature, however, is still present. Despite the clear recognition of the value of high temperature for power generation we venture forward at a very feeble rate. We have with steam practice, been using 1000 or 1050 F for many years. Most of us are reluctant to go even 100 degrees higher. 1100-1200 F will carry us to the top limit as set by our austenitic materials. Even that range is approached cautiously.

The progress toward higher temperatures is at a snail's pace compared to a jump from 2500 psi to 5000 psi in the pressure region. Thermodynamically the temperature increase is more necessary than the pressure increase. We have no alternative but to find materials and designs which will enable us to reach into the higher temperature ranges.

Our combustion temperatures are there and we need to learn to use them more effectively. This can mean not only the adaptation of many metals whose properties and whose manufacturing techniques have been possibly perfected under the atomic energy program, but also the development of non-metals, especially ceramics. If we could postulate 2000 F or 1800 F or even 1500 F the chances for improvement in our generation systems would be excellent.

This temperature barrier is very great and nothing can be said which can over-emphasize its significance. The temperature barrier not only blocks development in the steam power field, but even more so are we frustrated in the attempts to perfect gas turbines which will offer useful life periods, genuinely comparable to those obtainable on steam plants.

Corrosion and water problems . .

Southernmost Power Station

The Key West municipal plant, Southernmost power station in the United States, is unique in several respects because of location and climate.

By JOHN M. DRABELLE
Power Station Betterment Engineer
Key West, Florida

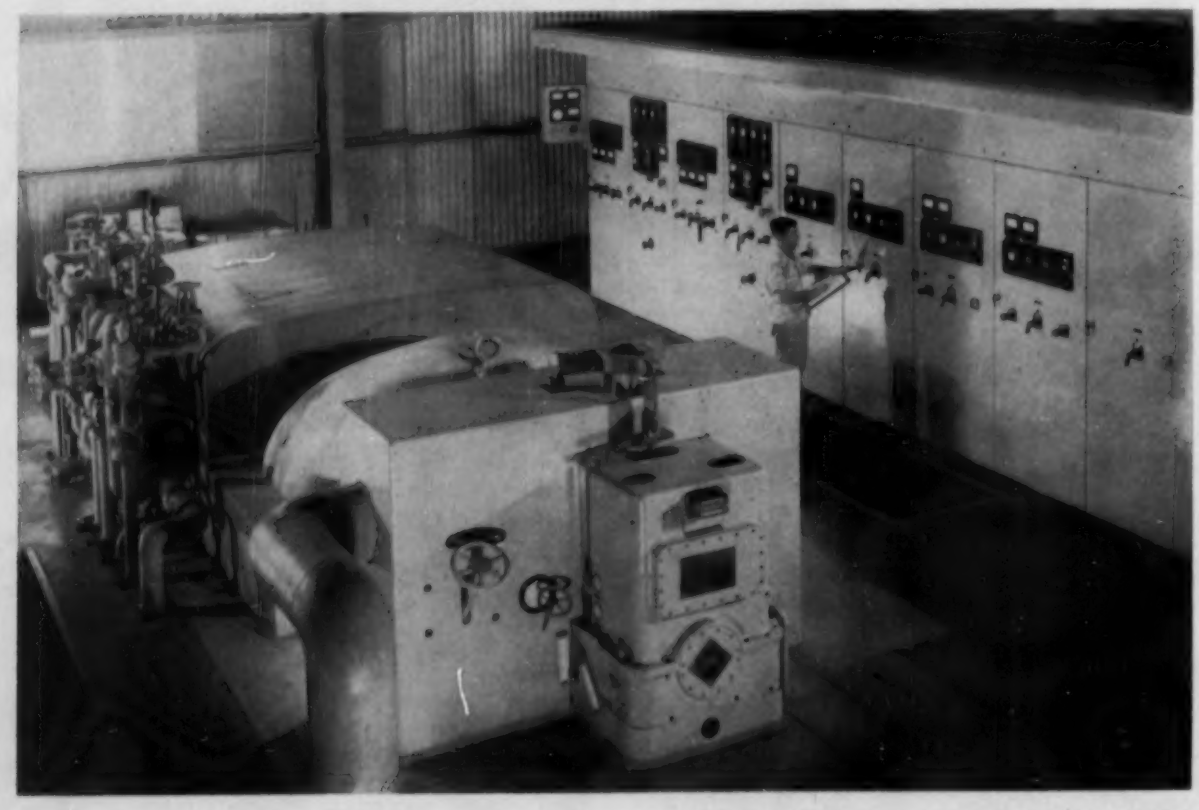
THE CITY ELECTRIC SYSTEM at Key West, Florida, has had a tremendous rate of growth over the past ten years, and increases continue at a rate that would double the load every five years if continued.

In many respects the new plant differs from conventional power stations due to pecular climatic and other tropical conditions: Hurricanes can be severe, salt spray corrosion is ever present, foundation problems are difficult, feedwater and circulating water supplies are unique—and it is a long, long distance from equipment supply sources. These conditions were all given due consideration in design.

Buildings and Equipment

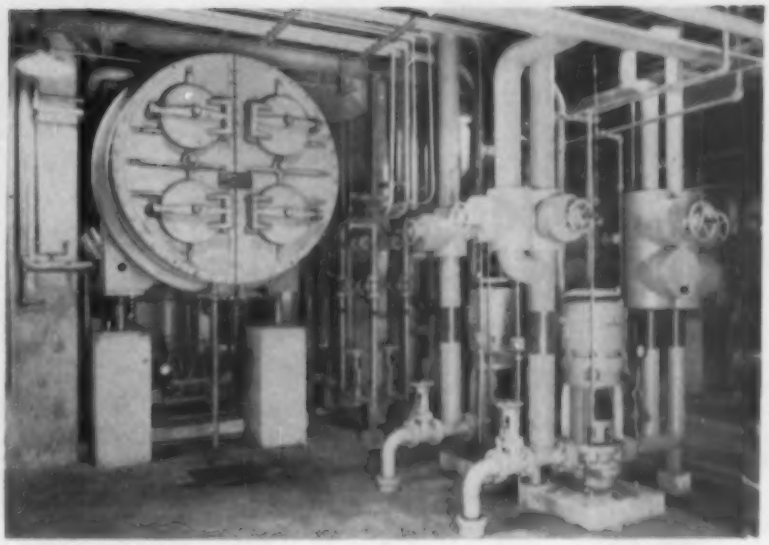
The building housing the generating equipment is of structural

View of Allis-Chalmers turbine and control board.



steel frame and reinforced concrete: 90 ft long, 85 ft wide, and 62 ft high. The boiler and turbine section is one room (second floor) without a division wall. The first floor is at ground level and is occupied by the condenser, various pumps, compressors and other equipment serving the station. The second floor is the operating floor, on which are located the control boards for the boilers and the turbines as well as the electrical switchgear. The office of Chief Engineer is also on this level. Deaerating heaters and other associated equipment are located on the third floor.

The unit type design has been followed throughout, namely, one boiler supplies one turbine—operating as an independent unit. The two units will be described in detail later.



View of Allis-Chalmers surface condenser, Fisher control valves and Byron Jackson boiler feed pumps.

Fuel Supply

The fuel is Bunker 'C' oil delivered by ocean going barges to the fuel oil dock and then pumped to two 300,000 gallon storage tanks which are protected by embankments. Approximately 250,000 gallons of fuel oil are burned every ten days.

Water Supply

The condensing water problem is unusual. This water is taken from the coral rock formation and being essentially sea water it carries about 2.8 parts per million of hydrogen sulphide which creates a serious corrosion situation in certain portions of the generating equipment.

Boilers and Auxiliaries

The boilers furnishing steam to turbines 1 and 2 are Riley Stoker Corporation type RX15, rated at 65,000 lb of steam per hour maximum at a superheater outlet pressure of 610 lb gauge and a steam temperature of 825 F. One of the illustrations shows the boiler front with the oil burners, their piping and control valves and the hot air duct.

The heating surface of the boiler is divided as follows: convection surface 6,065 sq ft; water walls 1,650 sq ft; superheater 2,040 sq ft; air preheater 6,450 sq ft. Furnace volume is 3,300 cu ft.

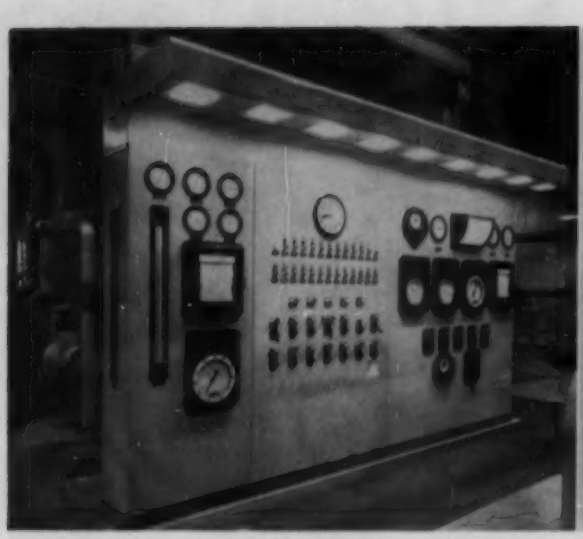
The burners firing the Bunker 'C' oil are Riley Number 3, flare type, steam atomizing. Temperature of preheated air to the burners is 400 F. The feedwater temperature to the boiler at maximum capability on either turbine is 322 F.

Fans and Controls

The fan system of each boiler consists of a forced draft fan with vane control, and an induced draft fan with a combination of vane control and a two-motor, two-speed drive. This equipment is of Buffalo Forge manufacture.

The combustion control system for both boilers, including feedwater regulation, is the Bailey air operated system, with three element feedwater control. The illustration shows centralized control boards for Unit 2, the Bailey Meter recording instruments, and the combustion control, and Leeds and Northrup instruments for recording temperatures of boiler gas, and the temperatures at various points

Boiler front showing burners, piping, and hot air duct.



Centralized control board showing Bailey meters, combustion controls, and Leeds & Northrup instruments.

View of unit type automatic reclosing sub-station, rated 3000/3750 kva, 13.8 kv to 4160 volt, 4 wire, grounded neutral.

in the feedwater heating cycle and the conductivity of water and steam.

The fuel oil pumping and heating equipment was manufactured by the Engineer Company. Three pumps and three heaters are installed.

Steam traps and strainers were furnished by Armstrong Machine Works; and regulating and reducing valves are by the Fisher Governor Co. Pressure gauges are Manning, Maxwell and Moore; and soot blowers are by Diamond Power Specialty Co. Johns Manville furnished the pipe covering and insulation.

Turbine-Generators

The two Allis-Chalmers, WA series type, generating units are rated at 5,000 kw (6,250 kw capability). Steam is supplied to the turbines at 600 psig and 825 F, and exhaust to the condenser is 2" Hg. Generator voltage is 13,800. Three extraction points are provided for feedwater heating. Each unit is equipped with a shaft driven exciter.

The two surface condensers are Allis-Chalmers, two-pass, top inlet, vertically divided water box units with 6,750 sq ft surface. The aluminum bronze tubes are expanded into the sheets, an expansion joint in the shell being provided.

The circulating water requirements are 6,950 gpm at turbine capability. Steam jet air ejectors are in duplicate, and are Allis-Chalmers two element, two stage type. The condensate pumps are Allis-Chalmers 4 x 3 type C2L, two stage, rated at 120 gpm.

The circulating water pumps, seven in number, together with their deep wells in the coral rock formation, were provided by the Layne-Atlantic and the Layne-Bowler Company. They are installed in the station yard and are equipped with weather-proof motors.

The turbine room area is served by a 35-ton Manning, Maxwell and Moore, Shaw Box, traveling crane. House service and miscellaneous pumps were furnished by Allis-Chalmers.

Feedwater System

The feedwater heating cycle consists of one deaerating and two closed type heaters. The Swartwout deaerating heater is supplied steam from the No. 2 (intermediate) extraction point. The two Griscom-Russell closed heaters are supplied steam from two extraction points—one about 90 psig, and the other subatmospheric. Each heater is rated at 65,000 pounds per hour. The temperature of the deaerating heater is held constant by a Foxboro M-40 controller that regulates the quantity of steam.

The boiler feed pumps consist of 4 units: two 150 gpm pumps driven by electric motors, one 150 gpm emergency pump driven by a Terry steam turbine, and one 75 gpm pump driven by electric motor. The latter pump is used for light load operation. These pumps are Byron Jackson, Hydro Press vertical type and are rated at 1985 ft total dynamic head.

Feedwater Treatment

Make-up of boiler feedwater is provided by two vertical Griscom-Russell evaporators, one for each unit. Supply for the evaporators is from cisterns that catch rain from the power plant roof. The city water supply serves as a reserve.

Water going to the evaporator is pre-treated with phosphate and lignin, to reduce the hardness of scale formed on the evaporator tubes.

A solution of phosphate and lignin is pumped to the boiler drum to maintain a phosphate residual of approximately 30 ppm, and caustic soda is employed to maintain a pH in the boiler drum water of approximately 8.5.

An amine compound is fed into the condensor hot well to maintain a pH of approximately 8 so as to prevent corrosion in discharge piping between hot well pump and deaerating feed water heater.

Electrical Equipment

The switchboard for the two generators and the various feeders is the Allis-Chalmers metal clad vertical lift type, using type A.B.V. air blast circuit breakers. The instruments and relays were supplied by Westinghouse Electric Corporation. The switchgear consists of two generator panels, two exciter and voltage regulator panels, two house service supply panels, and five outgoing feeder panels, all operating at 13.8 kv.

The station auxiliary power supply is 480 volts, 3-phase. The main auxiliary power switchgear is of Allis-Chalmers manufacture, using air-break breakers on 480 volt feeders going to various distributing panels, from which go the feeders to various station auxiliaries. The feeder distribution panels are of Square D manufacture.

The outside distributing plant, like the power supply, has during the past five years undergone a complete change from the conventional 2300 volt, 3-phase, 3-wire system. Now a sub-transmission system operating at 13.8 kv, transmits energy to area located substations and from these distribution to various sections of the city is at 4,160 volts, using the 4-wire, 3-phase system.

The distribution problem is complicated by the very large number of air conditioning and domestic refrigerators, all operated by fractional horsepower, single phase motors. These accentuate the power factor, voltage regulation and flicker problem. The system is serving approximately 800 customers.

Four 13.8 kv feeders from the power station transmit energy to four unit type automatic sub-stations rated at 3000/3750 kva. These sub-stations are equipped on the 4160 volt side with automatic reclosing circuit breakers in order to eliminate attendance and obtain prompt restoration of service.

In order to correct the low power factor caused by fractional horsepower motor loads, capacitors of both the fixed 575 rkva and switched type 675 rkva are employed on the distribution primaries.

KEY WEST

KEY WEST is located at the terminus of Highway No. 1, known as the "Overseas Highway." This unique road begins at Florida City and extends across numerous islands to Key West.

Water for the city is brought by pipe-line (paralleling the highway) from Florida City—serving the intervening Keys en route. The pipe-line is 126 miles long and has numerous booster stations along the way.

Modern Key West was originally served by the Florida and East Coast Railroad, a line completed in 1912 by the late Henry W. Flagler. It was known as "The Railroad that went to Sea." The hurricane of 1935 swept away many miles of the railroad and resulted in the permanent suspension of railway service to Key West. The State of Florida later took over and began rehabilitation, particularly directed toward the development of the highway together with tourist facilities and attractions.

Key West in recent years has become the headquarters of a large fleet of shrimp fishing boats due to the discovery of (Florida Pink Gold) extensive shrimp beds in the near vicinity.

A transmission line operating at present at 13.8 kv, (ultimate operating voltage 34.5 kv) extends from the generating station to Big Pine Key, a distance of 34 miles. The service area is developing at a very rapid rate now that water, electric power, communication and transportation have become available. Many people are moving out of the more congested areas of Northern Florida to the Keys where "life and fishing are good."

Results

The monthly heat rate of the Station is approximately 15,200 btu per net kwh at the present system load, however, at full load the heat rate has been 14,202 btu per net kwh. A definite program is now under way looking toward the further reduction of station light and power by tailoring the impellers of the boiler feed pumps to more closely fit the actual operating conditions of this station.

Experience has developed the fact that after a period of approximately 6 months' operation the units require inspection, cleaning and overhaul. Consequently, maintenance is scheduled on this basis.

Personnel Data

M. E. Rosam is General Manager of the City Electric System and reporting to him are L. W. Whitmarsh, Chief Engineer of the Power Station, and his assistant, Joseph Roberts. J. E. Bardwell is the Electrical Engineer of the System and R. C. Virgin is Superintendent of Transmission and Distribution.

The new generating station was constructed by The J. F. Pritchard Company of Kansas City, Missouri, engineers and contractors for the work. R. W. Beck and Associates of Columbus, Nebraska, served as consulting engineers. Charles A. Black, consulting Chemical Engineer of the Black Laboratory of Gainesville, Florida, has general supervision of the feedwater testing and treatment of the station. John M. Drabelle of Cedar Rapids, Iowa, is Power Station Betterment Engineer and Mechanical Consultant.

$ $ $ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

SP&I, 806 Peachtree St., N.E., Atlanta 5, Georgia

Better production idea for new and old plants . .

Mercury Routs Lighting Headache

Efficient, high-intensity lighting system established by combining two types of mercury lamps with the existing 85-watt RF fluorescent lamps. Foot-candles raised from 25 to an average of 65.

By LEE M. WALLACE
Regional Engineer, Lamp Division
Westinghouse Electric Corporation
St. Louis, Missouri

MERCURY lighting has solved a delicate production problem for the Douglas Aircraft Company. At Tulsa, Oklahoma, Douglas is under contract to manage and operate a massive plant for the U. S. Air Force, producing Boeing's six-engined B-47 Stratojet medium bomber in buildings owned and maintained by the government.

The major portion of the production is done in a windowless building four-fifths of a mile long, wide as a city block, and 40 ft high. At the bench level, only a few feet off the cement floor of the cavernous structure, thousands of detailed wiring, boring and tubing tasks are accomplished.

Douglas accepted its management job in 1951 and took over the building after a small army of laborers had vacuumed the dust from the horizontal steel struts supporting the roof, cleaned off the thousands of lighting fixtures mounted at the 40 ft top, and scrubbed down the walls and floors.

Inadequate Lighting

Production got under way at once, but not without headaches. Among the more painful of the headaches was one that resulted from unsatisfactory lighting. Illumination was supplied by a system of highway fluorescent lighting using the 85-watt RF lamp—a lamp that was fairly economical to operate, that gave a pleasant white light with a bluish tint and that, from 11,520 double-lamped fixtures at the 40 ft mounting height, produced 25 foot-candles at the working level.

The lighting fixtures would not accommodate modern, more-efficient fluorescent tubes. And, the existing equipment could not be ripped out, discarded and replaced without an economic loss. But 25 foot-candles was not enough light.

Test Installation of Fluorescent-Mercury Lamps

Solving the problem, and solving it fast, fell to the engineering staff of the Douglas Tulsa Division: *Leo J. Milan*, plant engineer; *Paul Huska*, then a member of the team; *Maurice J. McCarty*, now general supervisor of plant engineering, and *Kenneth C. Daubney*, chief plant electrical engineer.

They first analyzed existing lighting in a 200 ft wide bay in which much of the precision work was done. They found that the overall 85 RF lighting system was laid out so that there were 160 groups of fixtures stretched from one end of the 4,000 ft plant to the other, each group consisting of two adjacent rows of double-lamped fixtures mounted from edge to edge of the bay's 200 ft width, and with 24 fixtures to the row. Spacing between each group of fluorescent lamps was 25 ft, center to center.

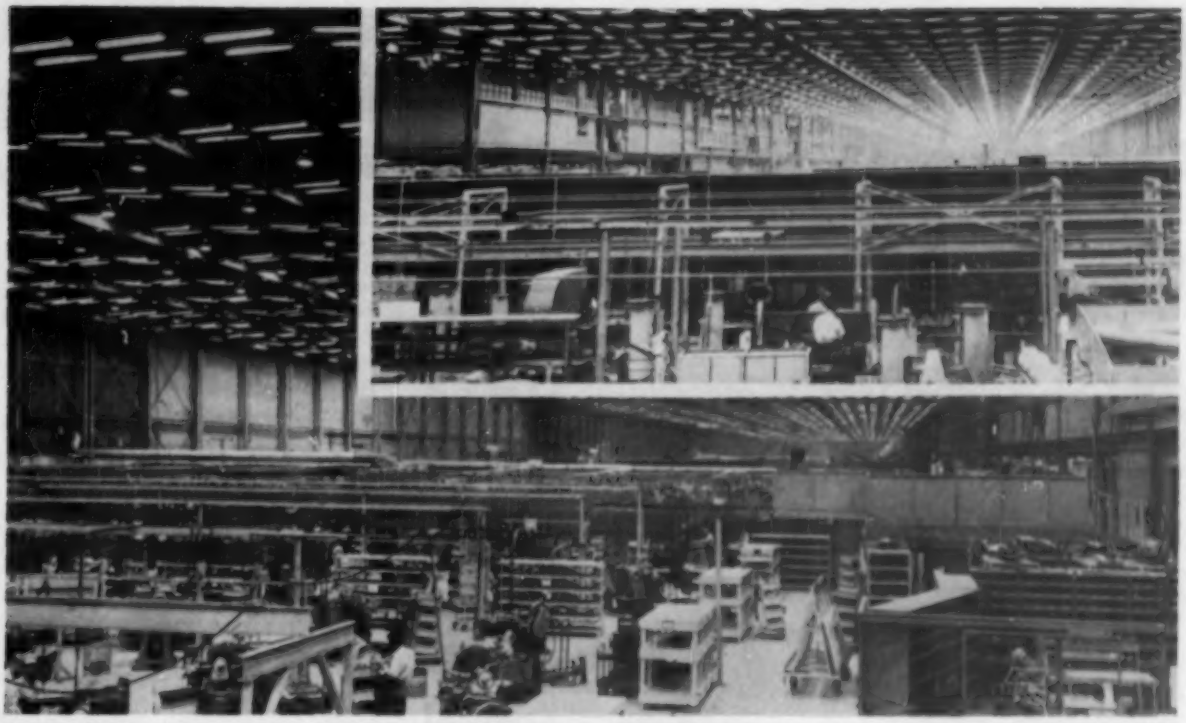
After consulting with Westinghouse lighting engineers on the specifications of the relatively new 1,000-watt fluorescent-mercury lamp, they decided to install a group of 90 in the template and tooling area, mounting them halfway between each group of 85-watt fluorescents—or on 25 ft centers lengthwise—and spaced on 20 ft centers across the width of the bay in the template and tooling area.

Mercury Lamp Data

In the area covered by this test installation, they found a startling improvement resulted from adding the fluorescent-mercury lamps. The new light sources consist of mercury quartz arc tubes enclosed in fluorescent-coated outer bulbs which supply a red tint that is missing in the traditional blue-green hue of mercury. The result is a cool white illumination with highly acceptable color-accuracy qualities. Light-meter readings showed that the new lamps, added to the fluorescents, raised the foot-candles from 25 to an average of 65.

Better Production

With this trial installation, tests were run to determine how well mechanics could identify de-



TWO TYPES of mercury lamps are mixed with the old 85-watt RF fluorescent lamps in the machine shop of the Douglas Tulsa Division, to give 65 foot-candles for close tolerance work. Only the 85 RFs are used in the tail assembly department (far background) to give 25 foot-candles at working level.

INSERT PHOTO shows 4/5ths of a mile stretch at the Douglas aircraft plant in Tulsa, where only 85-watt RF fluorescent lamps illuminate the foreground (25 foot candles) while 1,000-watt mercury and fluorescent-mercury, added to the RF 85 installation in the background add 40 foot-candles to lighting of the working level.

tails on metal products. They were able to pick out scratches and dents in the metal much more readily than before. These details were discernable just about as well as in direct sunlight.

After evaluating other factors, such as glare and the degree of color-correction, they approved the principle of mingling mercury with the existing RF fluorescent lamps. They were then ready to apply their lighting combination to the machine shop which occupied a large segment of the main 200 ft wide bay.

In plane manufacturing and assembling, according to McCarty, accurate color rendition is less important than it might be in many other manufacturing processes. It is certainly less important, relatively, than the total lumen output attainable without sacrificing too much color tone. Following that principle, it was decided to fill half the new mercury outlets with 1,000-watt fluorescent-mercury and half with clear mercury lamps—C-H12 and A-H12—and thereby secure the benefit of the increased lumen output from the clear mercuries.

The efficient, high-intensity lighting system in the machine shop and tooling areas of the broad-bay Tulsa operation is illustrated. In almost constant operation as an entity for approximately eight months, the overall installation supplies a maintained output of 60 foot-candles, the fluorescent tubes producing 25 foot-candles and consuming 307 kilowatts, while the mercury produces 35 foot-candles and consumes 347 kilowatts. Electrical distribution is three-phase 480-volt. Ballasts are Westinghouse step-down type for the 220-volt open-circuit A-H12 and C-H12 lamps.

There is no fixed schedule for cleaning the fixtures. Vents at the top, in the first place, prevent dirt from accumulating as it might in unventilated fixtures. Equally important, though, is the fact that the plant is entirely air conditioned and relatively dirt-free. A strict schedule for washing the light-toned cement floor is maintained, however, thus helping to reflect considerable light. Walls are finished a buff yellow and reflect about 62% of the light that strikes them.

What the Douglas installation has achieved, besides, is an interesting new pattern of lighting that might attract other large-plant operators: a general, over-all diffused-daylight atmosphere with a direct sunlight effect supplied by a color-corrected mercury combination.

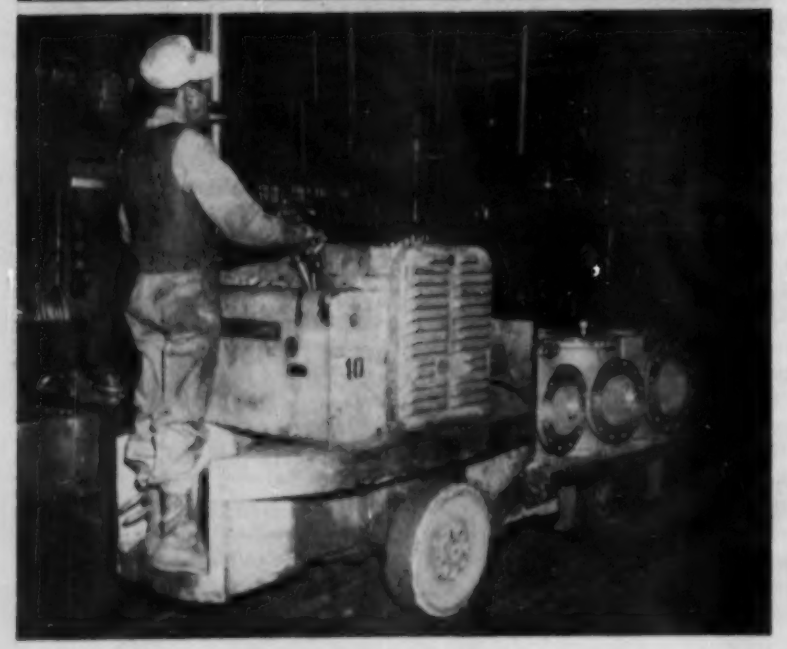
"We are utterly convinced in our collective minds that we have made an ideal adjustment," McCarty said recently. "We have

(*Continued on page 59*)

Platform Trucks Aid Safety

Stockham Valves & Fittings, Inc., Birmingham, Alabama

HOW DO you effectively and economically handle a wide variety of heavy, sometimes exceptionally hot, often irregularly-shaped material? That was the problem faced by Stockham Valves & Fittings, Inc., Birmingham, Alabama, manufacturers of cast iron and malleable pipe fittings, and bronze, iron-body and steel valves. Additional considerations: because of the inherent operating conditions associated with its industry, the company sought some means of keeping accidents to a minimum and making every employee conscious of the importance of good housekeeping.



In days gone by, the company relied mainly on wheelbarrows for its handling. Physical effort was severe; moves were slow and tedious. But today's plant is modern. The present clean, neat structure provides a total area of 548,000 sq ft for production facilities manned by 1410 people.

To solve the problem of handling its varied loads, the company employs a fleet of 12 Elwell-Parker low-lift platform trucks which are responsible for the majority of the handling within and between the annealing, grey iron inspection, pickling and galvanizing, and valve departments, and to and from the tapping room.

Typical loads consist of machined and unmachined bronze and iron castings, and pipe fittings and valve parts. Handling conditions vary widely since trucks are called on to place and remove heavy iron pots holding castings into and from annealing ovens; to transport skid boxes full of small castings; to move skid loads of large flange fittings; and in general, to be as flexible as are the loads. As indicated, where small parts are involved, skid bins are used; larger individual pieces are made up into load units and moved on standard skids. Both skids and skid bins

▲ FITTINGS LEAVING the galvanizing kettle, are routed through an automatic quench tank, then transferred to a discharge conveyor. Here, fittings are returned to skid boxes to be picked up by truck and delivered to the tapping room.

◀ SKID LOAD of flanged fittings is being transported by platform truck through a tunnel under railroad tracks to the Final Inspection Department. Correct placing of fittings on skid eliminates the need for sides.

measure 3′ wide x 5′ long x 12″ to 24″ deep.

The trucks have reduced physical effort to a minimum and are responsible for a smooth, coordinated material flow. They are rugged enough to operate in the annealing area where temperatures rise to 1800 degrees in addition to normal work areas throughout the plant.

Maintenance Cycle

A good deal of credit for the trucks' ability to stand up to the severe daily work schedule must be given to the company's preventive maintenance program.

All vehicles are required to visit the maintenance department every two weeks. At this time, they are thoroughly inspected and lubricated. Any needed repairs are taken care of at this time. Many minor adjustments are thus caught before a major repair is necessary. In addition to the strict maintenance schedule, truck operators have been educated to be on the lookout for any possible danger signs and report them immediately.

This driver education and strict maintenance scheduling has racked up an extremely low out-of-service record for the trucks. Even though they are subjected to the most severe operating conditions, trucks require on the average, only two hours per month in the maintenance shop.

Safety Aspects

While foundries and other metalworking operations are not noted for good safety records and well kept plants, this company launched a comprehensive program to overcome both problems.

Mechanized handling and employee training have been largely responsible for the fact that even though operating conditions are severe, the plant as a whole recorded 2,560,065 man-hours without a lost-time accident.

Indicative of the employee educational program are the 15-minute safety meetings held every week by the maintenance department. Workers within the department plan and conduct the meetings. Outside speakers are also invited to take part in these meetings as is management personnel. All in all, the program has made every employee, regardless of his duties, extremely conscious of the importance of safety.

To encourage good housekeeping, contests are held for the cleanest department with prizes awarded to winning personnel. Such prizes range from caps, safety shoes, etc., to a trip to the World Series for the supervisor of the winning group.

CASTING ARE LOADED into heavy iron pots, in the Annealing Department. They are then sealed and placed in ovens by a specially designed platform truck. Pots are soaked at a temperature of 1800 F for several days.

▶CASTINGS LEAVING the cleaning mill, are delivered by conveyor to the inspection department. Here they are sorted into skid boxes to be transported by truck to either the Galvanizing Department or the Tapping Room. This truck is removing a box of T's from the inspection line.

Top-notch trouble-shooting in Dallas, Texas, plant . .

Motor Failures Eliminated

Spar mill motor condensation damage was extensive. Plant electricians apply low voltage load, automatically regulated by motor's coolant pump. Safety features protect low voltage transformers.

MOISTURE starts fires when it saturates insulation on motor windings and grounds the wiring. Damage to this 50 hp Onsrud spar mill motor was caused by moisture condensation in the windings. Repair will cost $250 to $350.

TEMCO Aircraft Corporation's large spar mill section is insuring itself against $2500 to $3500 annual loss in motor damage at a cost of only $400.

This saving is the result of an investigation that began when maintenance men noticed a relationship between spar mill downtime and spar mill motor failure.

When operation was more or less continuous, little maintenance was required on the 60-ft spar mills. But when one or several of the company's eight mills shut down for a short time, trouble started.

Why Motors Failed?

Maintenance electricians soon diagnosed the cause. When a motor stopped and its temperature dropped, moisture from the motor's water-cooling system condensed on the motor windings. This dampened the winding insulation, grounded the wiring and caused it to burn out.

Maintenance men estimated that condensation damage would claim about 10 to 12 motors a year, if it weren't controlled. Cost of rewinding a damaged motor ranged from $250 to $350.

Problem Analyzed

A drying device for spar mill motors would have to be automatic to be effective, electricians agreed.

Fans or blowers couldn't be used because windings on each spar mill's four Onsrud 50-hp motors were tightly sealed under double water-proof jackets.

Electricians tried baking spar mill motors in ovens. To determine which motors needed drying, electricians made "megger" checks on motor winding insulation. When a low megger reading indicated deteriorating insulation, they disassembled the motor and baked critical parts in an oven for 48 hours at 225 to 250 F.

Portion of Temco Aircraft Corporation's spar mill section. Maintenance men noticed a relationship between spar mill down-time and spar mill motor failure.

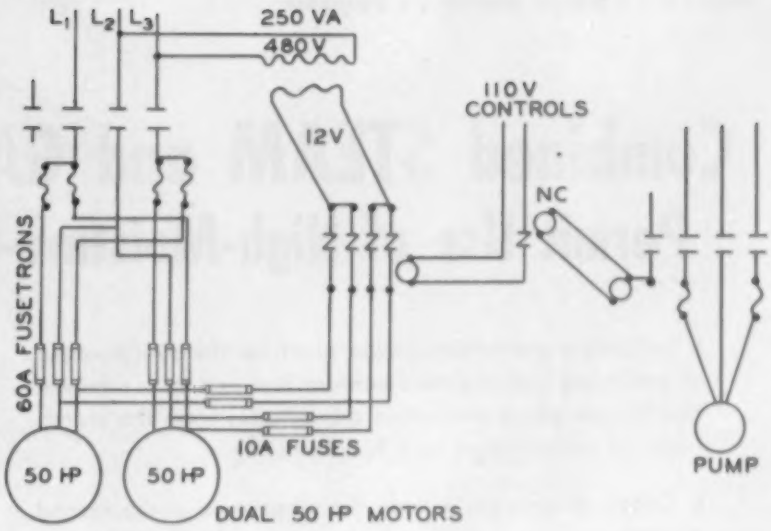


Diagram shows low voltage hook-up to the motor leads. This system, conceived by Temco's maintenance foreman C. M. Turner, solved a troublesome maintenance problem.

This method dried out motor moisture, but it used up manhours, too. Two men needed a day and a half just to disassemble and reassemble a motor.

Automatic Drying

Maintenance Foreman C. M. Turner, meantime, decided the best way to dry out moist insulation was with a low voltage load. He set up a motor on a bench, placed a thermometer inside the motor where the motor leads enter, and experimented with several loads.

He found that 12 volts, using approximately 100 watts provided by a single phase transformer, maintained a temperature of about 110 degrees in the idle motor. This was just right—not too hot, but warm enough to discourage condensation.

Turner arranged for his low voltage transformer to be regulated by operation of the spar mill motor's coolant pump. The drying load is turned on, automatically, when the spar mill operator turns off the coolant pump. Stopping the pump opens a normally-closed relay which closes a size 1, four-pole relay. This relay supplies 12 volts on one phase of motor leads.

Starting the coolant pump, on the other hand, disconnects the low-voltage relay.

By linking the low-voltage load with pump operation, Turner avoided subjecting his drying system to many stops and starts made by the machine itself. The spar mill may be started 50 times a day. But, normally, the pump—which operates independently of the spar mill—is turned off only when the mill is shut down at the end of a shift. This formerly was the period of condensation, the time when a drying system was needed.

Two safety features protect the transformers supplying low voltage. One safeguard is the fact that the spar mill can't be turned on until the pump is operating. Since turning on the pump automatically disconnects the low-voltage feed, there is no danger of the spar mill's 440-volt feed reaching the 12-volt transformers.

As a double precaution, the feed from the 12-volt transformers is fused.

The maintenance crew already has installed the low-voltage drier on two spar mills. Driers will go on the remaining six mills as soon as production schedules permit. Cost of the transformers, wiring and fuses required will average about $50 per machine.

Mercury Lighting

(*Starts page* 54)

The addition of mercury types of lighting solved the Douglas-Tulsa problem without disposing uneconomically of fluorescent equipment which could not, in itself, be modernized. The solution paid for itself through savings in production efficiency.

committed ourselves to this kind of combination lighting for our needs, and should it become necessary to extend our precision work to any other part of the plant now lighted with fluorescent, we wouldn't hesitate a moment to extend our clear and fluorescent-mercury installations to assure ourselves of this most efficient level of manufacturing from the outset."

Douglas engineers, from the technical point of view, are so satisfied with results obtained that they have added combination mercury lighting to other fluorescent-lighted areas, notably to the 45,000 sq ft soldering and wiring area on "Monkey Island," the narrow bay adjacent to the wide bay previously discussed. Because of a lower mounting height, a level of 60 foot-candles, maintained, was achieved with the use of 400-watt mercuries. Additional combination lighting also has been added to the drop-hammer room, and a machine shop in another building.

"If we are called upon to work on new-building plans," McCarty states, "we would not waver on the use of mercury and fluorescent-mercury in combination. Beyond this, though, we would also give serious consideration to attaining our desired lighting level by mingling the combination with modern fluorescent tubes. We believe that this mixture would give us thoroughly satisfactory color while providing high-intensity lighting at an advantageous efficiency level."

Lignite . . wood waste . . bagasse

Combined STEAM and GAS TURBINES
Permit Use of High-Moisture-Content Fuels

▶ Utilizing a gas-turbine power plant for the dual purpose of predrying high moisture-content fuel and as a combustion topper offers distinctive advantages from the standpoint of performance and fuel economy.

▶ Other advantages include the elimination of the forced draft fan, the possibility of obtaining valuable tars as a by-product of a carbonization process for lignite, and perhaps other economic benefits which can be appraised only through specific analysis of prevailing conditions in a particular industry.

By JOHN F. LEE
SP&I Consultant
Professor of Mechanical Engineering
North Carolina State College
Raleigh, North Carolina

THE simple gas turbine is generally conceded to be a low-cost and expeditious means for increasing the installed capacity of a power plant. However, the comparatively low thermal efficiency of the simple gas turbine tends to offset the advantages of low capital cost and speed of installation.

One important cause of low thermal efficiency is the rather high temperature (700 F to 900 F) of the discharge gases. But when these gases are utilized to dry high moisture fuels, the simple gas turbine used in conjunction with a steam power plant can be extremely attractive.

The economic picture is even more attractive when the exhaust gases from the gas turbine, instead of atmospheric air, are also used to support combustion in the steam generator—resulting in improvement of the thermal efficiency of the steam power plant. This arrangement also permits elimination of a forced draft fan since the gases from the gas turbine can be discharged at the desired windbox pressure.

In effect, the gas turbine can be used as a source of hot gases to predry wet low-grade fuels and at the same time serve as a combustion booster without the need for a forced draft fan. Heat balances show that the thermal efficiency of the combination is superior to that of either the gas-turbine or steam power plant in independent operation.

High-Moisture Fuels

Before discussing the relative merits of utilizing the exhaust gases from a gas turbine as a drying agent for wet fuels it is worth while to review the characteristics of three such fuels of particular economic importance in the South and Southwest.

First in importance is **lignite**, a high-moisture fuel, underlaying an area extending over 60,000 square miles in Texas. Large deposits of this fuel are also found in North Dakota and lesser deposits exist in Arkansas, Colorado, Kansas, Montana, and New Mexico.

Next in importance as a high-moisture fuel is the **wood waste** resulting from lumber production operations and the wood waste, principally in the form of wet-bark, produced in paper mills. The wood waste produced in lumber mills usually consists of sawdust, shavings, bark and chips. The moisture content of this fuel is highly variable depending on whether or not the wood has been air-dried, the method of storage, and the method of handling.

Normally the moisture content of freshly cut wood will vary from 32 to 55% and after air drying for a year the moisture content will

Table I—Typical Ultimate Analyses, Per Cent

Fuel	Moisture	S	H_2	C	N_2	O_2	Ash	Heating Value (Dry Basis)
Lignite	33-38	0.8-1.8	4-4.6	64-65	1.2-1.9	15.5-18.5	11-12	11,030-11,080
Wood Waste	80-90	— —	6-6.3	50-52	0.1	40-41.3	0.5-2	9,000-9,150
Bagasse	41-45	— —	5-7	43-47	0.2-0.4	45-49	1.3-3.0	8,000-8,700
Spent Tan Bark	65-75	— —	5-6	51-53	0.1	40-41	1-2	9,900-10,100

be between 20 and 28%. The wood waste from paper mills usually consists of bark, culls, butts, sawdust and screen tailings. The moisture content of this fuel can vary from 65 to 90% but 80 to 90% is a usual range. With such a high moisture content the wood waste produced in a paper mill is impossible to burn unless some means of predrying is provided.

Also under the general classification of waste-wood fuels is the fibrous part of the bark, known as spent tan bark, resulting from the operations of the tanning industry. Normally this waste product is not used as a fuel at all but instead is disposed by incineration at the expense of using a supplementary fuel.

Finally, there is **bagasse**, a refuse produced in the process of extracting sugar from cane, which is available in Louisiana, Cuba, Hawaii, Mexico, Peru, and Puerto Rico.

Besides their two common characteristics of high moisture content and relatively low heating value, these three fuels share a third characteristic in that it is not economical to transport them long distances from the areas in which they are found. However, when there is a sufficient concentration of these fuels in a given area, they can provide an attractive source of fuel for either public utility or industrial power requirements.

Table 1 shows typical ultimate analyses of lignite, wood waste, bagasse, and spent tan bark with their heating values. The moisture content given in the table for wood waste refers to the waste produced in paper mill operation. As can be seen readily from the table these fuels do not provide very encouraging analyses from the standpoint of combustion.

The special requirements necessary to make combustion feasible serve to detract from the economic desirability of using any of these fuels. In the past, a number of specialized furnace designs were used to burn raw lignite, wood waste or bagasse with the result that the initial cost of the steam generator was greatly increased. Furthermore, operating experience

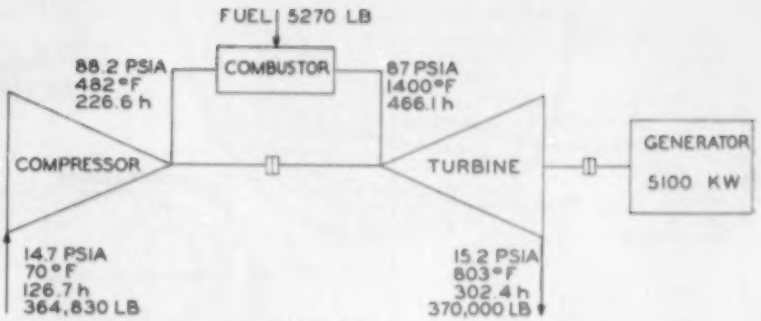


Fig. 1. Simple gas turbine with heat balance data

with these special furnaces indicates that they can be troublesome.

Crushing and predrying the fuel before its introduction into the furnace has proved more satisfactory since this method permits a simpler furnace design, better conditions for combustion, and lower maintenance. However, predrying requires an auxiliary source of heat and it is here that the hot gases discharged from a gas turbine can serve a useful purpose.

Using Exhaust Gases to Predry Fuels

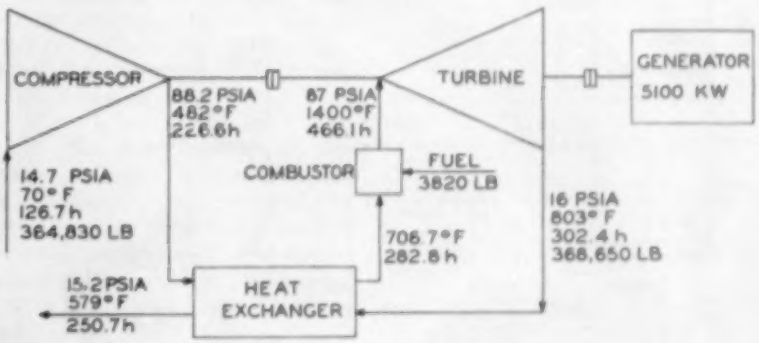
Figure 1 shows a schematic arrangement of a simple gas-turbine power plant with typical heat balance data. The major components are the compressor, gas turbine and combustor. When the plant is operating, atmospheric air is drawn into the compressor where it is compressed and flows to the combustor. Residual fuel oil is injected into the air stream moving through the combustor and is burned with an extremely high efficiency. The products of combustion leave the combustor at an elevated temperature and pressure to expand in the gas turbine from which they are normally rejected to the atmosphere.

Instead of rejecting the gases leaving the gas turbine they can be utilized to predry high-moisture-content fuels. This arrangement permits the abstraction of useful work from the exhaust gases.

From the heat balance data of Fig. 1 it is noted that the gas turbine exhausts at 803 F. The exhaust gases are capable of drying 133,000 lb per hr of crushed lignite when the initial moisture content is 35% and the moisture content and temperature of the lignite leaving the dryer are 5% and 300 F, respectively.

Similarly, 100,000 lb per hr of bagasse can be dried when the initial moisture content is 45% and the final moisture content and temperature are 5% and 300 F, respectively, and 67,000 lb per hr of wood waste when the initial

Fig. 2. Gas turbine power plant with heat exchanger



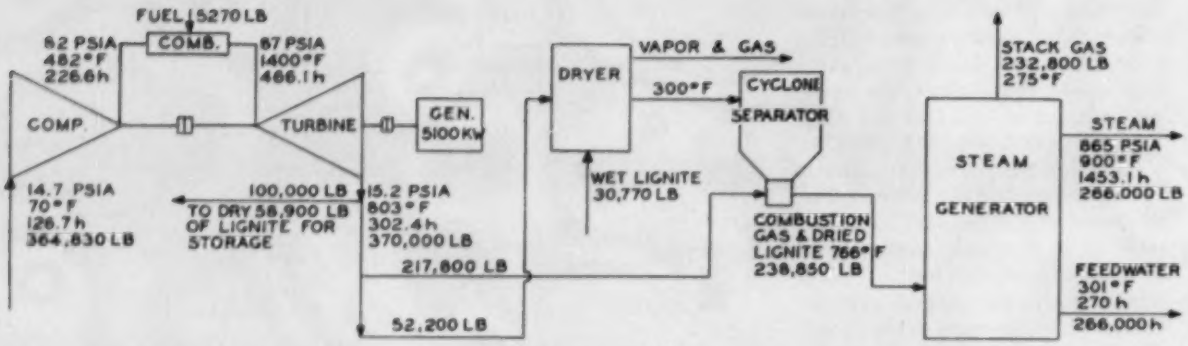


Fig. 3. Gas turbine exhaust gases utilized to dry lignite and support combustion in a steam generator

moisture content is 85% and the final moisture content is 20% at a temperature of 300 F.

Assuming an overall heat rate of 12,000 Btu per kw-hr for a steam power plant, lignite could be dried at a rate sufficient to support an average load of 84,000 kw. Bagasse and wood waste would be dried at a rate sufficient for an average load of 39,000 kw. The drying rate for spent tan bark would support an average load of 72,500 kw.

One other factor deserves special attention because of its promise. Recent investigations of the U. S. Bureau of Mines indicates that it should be possible to carbonize lignite and thus make available valuable tars as a by-product. Since the carbonization process would utilize lower temperature gases as a drying agent a heat exchanger could be introduced into the gas turbine power plant, as shown in Fig. 2, resulting in a marked increase in the therma. efficiency of this plant. The char produced in the carbonization process would serve as an excellent fuel for firing the steam generator of a steam power plant.

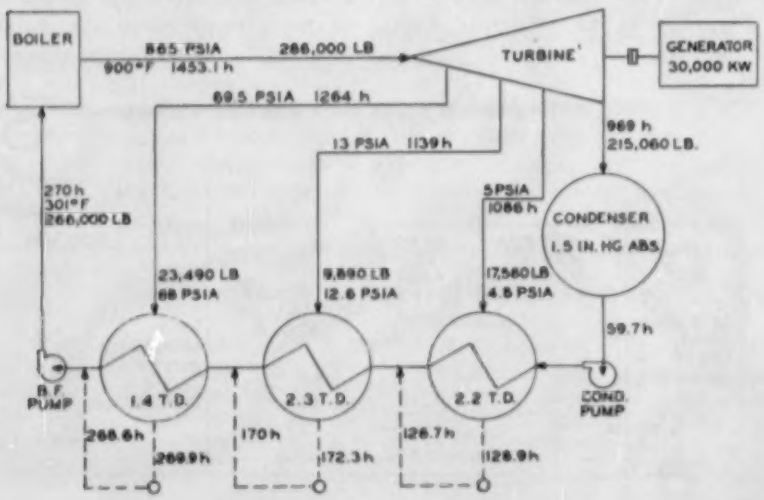
Gas Turbine as a Combustion Booster

In addition to serving the function of a source of heat for predrying the fuel the gas-turbine exhaust gases also can be utilized to support combustion in a steam generator in place of ordinary air. This is possible because it is necessary to use sufficient air in the combustor of the gas turbine so that the products of combustion are at an acceptably low temperature for use in the gas turbine. At present the maximum temperature of the gases entering gas turbines is 1500 F because of metallurgical limitations. For this reason the ratio of the total air to the fuel in the combustor is about 6.5 times that of the theoretical air-fuel ratio. As a result the exhaust gases from the gas turbine do not differ materially from atmospheric air as to free oxygen content.

Figure 3 shows a schematic arrangement of the gas-turbine power plant of Fig. 1 used as a combustion topper. For the purpose of the calculations a steam generator is taken to be direct-fired with pulverized lignite and to have a rated capacity of 300,000 lb per hr of steam at 850 psig and 900 F. Heat transfer surface in the steam generator is proportioned so that the stack gas temperature at 275 F at rated output.

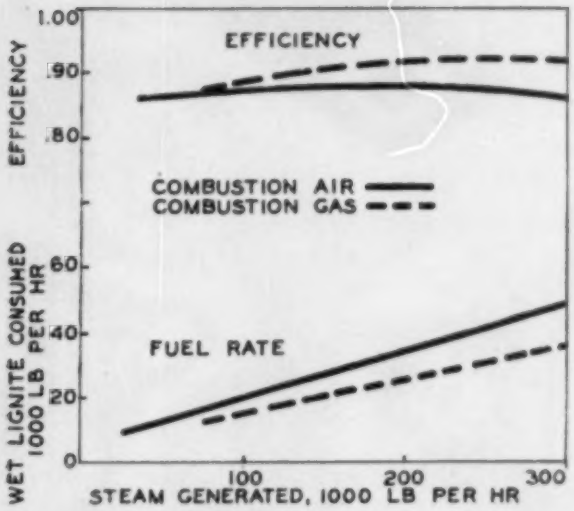
From Fig. 3 it is seen that of the 370,000 lb per hr of exhaust gases from the gas turbine 52,200 lb per hr are required to dry 30,770 lb per hr of wet lignite and 217,800 lb per hr of exhaust gases are used to pick up the dried lignite dust from the cyclone separator and to support combustion in the steam generator. Approximately 100,000 lb per hr of gas-turbine exhaust gases are available to dry 58,900 lb per hr of wet lignite for storage.

Fig. 4. Simplified heat balance diagram for steam power plant



Waste Heat Recovery

An examination of the data given in Fig. 3 shows that 69% of the energy in the gas-turbine exhaust gases, which would be wasted otherwise, is recovered either in predrying lignite or in the steam generator. About 40% of this energy is recovered in the



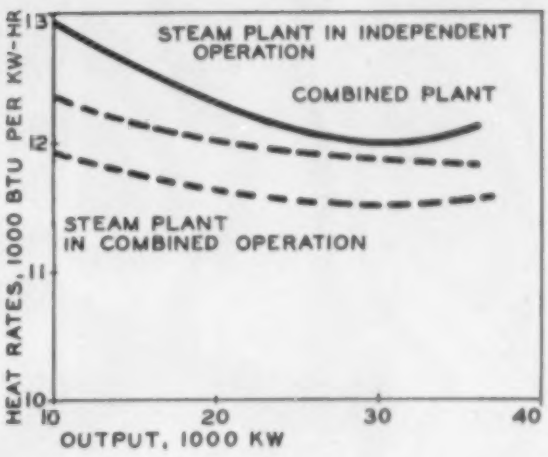


Fig. 5. Performance characteristics of steam generator. Fig. 6. (right) Comparison of heat rates for combined plant and steam power plant.

steam generator representing a saving of 3590 lb per hr of raw lignite. About 9.8% of the energy is utilized to dry lignite for immediate firing in the steam generator and approximately 12% is used to dry lignite for storage.

The stored lignite can be used at times when the gas turbine unit is not required to meet the demand on the combined plant. It is particularly significant to note that even if a heat exchanger were to be used in the gas turbine power plant as shown in Fig. 2, in independent operation only 31% of the energy in the gas turbine exhaust gases could be recovered. Furthermore, the addition of a heat exchanger would increase the size and capital cost of the gas-turbine plant by very considerable amounts.

Performance of the Combined Plant

Figure 4 shows a simplified heat balance for the steam power plant. In independent operation the heat rate of this plant is 12,000 Btu per kw-hr. The heat rate of the gas-turbine power plant in independent operation is 19,180 Btu per kw-hr. In combined operation where the gas turbine is used as a combustion topper a number of significant factors are observed.

Here are some of the advantages which may be expected.

(a) The maximum temperature in combined operation is raised to 1400 F and the minimum temperature is lowered to about 92 F thus contributing to a **lower heat rate** for the combined plant.

(b) **About 40% of the energy** in the exhaust gases from the gas turbine, which would be lost in independent operation, **is made available** to do useful work in the steam power plant.

(c) The part-load performance of the simple gas-turbine power plant is notoriously bad. Combined operation makes it possible to take **load fluctuations on the steam power plant** since it has a flatter heat-rate curve. In this way the gas turbine unit can be operated continuously at the most efficient load. When the load falls to the point where the heat rate of the steam power plant would be adversely affected the gas turbine unit can be taken off the line and dried lignite can be used from storage.

(d) The **performance of the steam generator is improved** due to the higher temperature of the gases used to support combustion and the reduced load of moisture passing through the steam generator because of dry state of the fuel.

(e) The **heat transfer rates** in the steam generator **are improved** because of higher combustion temperatures achieved with the dry fuel and as a result the capacity of the unit can be increased.

Figure 5 shows a chart which indicates the effect on the performance of the steam generator when using gas-turbine exhaust gases to support combustion instead of atmospheric air. Figure 6 shows a comparison of the heat rate curves for the steam power plant in independent operation and in combined operation and the heat rate curve for the combined plant. From these curves it can be readily seen that the heat rate of the combined plant is superior to that of either the gas-turbine plant (19,180 Btu per kw-hr) or the steam power plant in independent operation.

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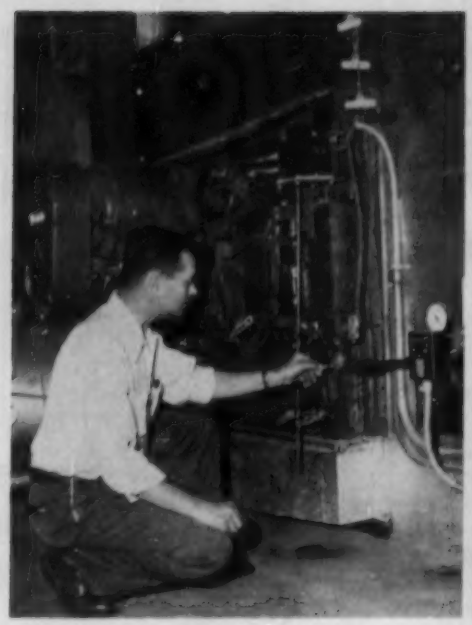
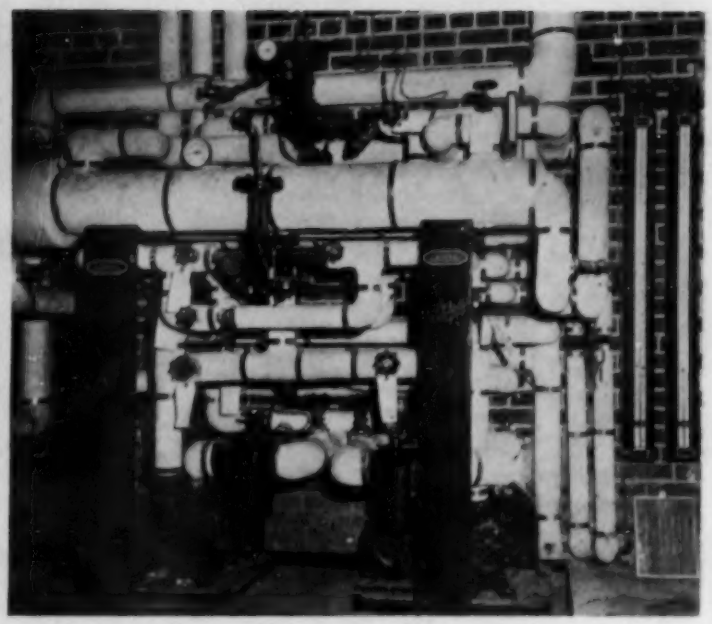


The author adjusting flow on solenoid oil valve.



Double suction pump filters and oil heaters, either of which will handle both boilers. Petrometer oil level gauges at right.

MODERN BOILER INSTALLATION At Joanna Cotton Mills Co.

12% Saving in Steam Cost

By CARL FRANZEN, Master Mechanic
Joanna Cotton Mills Co., Joanna, S. C.

TWO old hand-fired boilers came to rest recently after twenty-two years of hard service, when Joanna Cotton Mills Co., Joanna, South Carolina, put into operation a new steam plant. The old boilers were still in good shape, but steady growth and expansion of the mill had brought steam requirements beyond their capacity to produce. At times, parts of the mill had to be shut down to keep up pressure.

Considerable study and planning showed that it would be desirable to build an entirely new boiler plant instead of modernizing the old one, because the cost of modernization would be high and the plant would still not be as modern as desired.

After considerable investigation, two Erie City Type V-L water tube boilers were selected. Each has a normal load of 16,000 lb of steam per hour, with a designed boiler pressure of 160 psi, and a rating of 250 hp at 100%. These 2-drum boilers incorporate side wall water cooling as an integral feature, which virtually eliminates refractory maintenance.

The boilers are fired with Todd type-RAH rotary fuel oil burners, using Bunker C (No. 6) oil. These burners are of the horizontal atomizing type, in which atomization is accomplished by feeding the oil into an open horizontal cup, rotated at high speed by a direct-connected motor.

Primary air for atomization is supplied by a cast aluminum fan mounted on the same shaft as the spinning cup and driven by the same motor. Secondary air for combustion is admitted below the burner through a hinged air door bolted to the cast iron front plate, and is supplied by a Wing blower mounted on the floor in front of the boiler.

Fluctuating steam load is controlled through Minneapolis-Honeywell Modulating Pressuretrols, which automatically raise or lower the firing rate, and so maintain constant steam pressure in the boilers. Dampers on the blowers are connected to the Modutrol motor, and as the firing rate increases or decreases the proper amount of air is admitted at all times. Two sets of Pressuretrols are used; one at 100 psi for normal operation, and one at 50 psi for week-ends or other times when the plant is shut down but steam is still required by other buildings served.

Correct draft for combustion is controlled with a Hays Sequence Furnace Draft Controller. Burned gasses are exhausted with American Blower fans connected to a 60-ft steel stack. The boilers are equipped with Vulcan soot blowers, with 2½ in. rotary heads.

The steam header for both boilers is mounted 5 ft above the floor level, for easy accessibility to valves feeding various sections of the mill and other buildings.

Safety features are 3 pop-off valves on each boiler, low water alarm whistles, and a Magnetrol low water control which shuts off the entire boiler. A Fireye system, by Combustion Control Corp., has a photoelectric tube mounted near the burner, which will, if it fails to "see" a flame burning, cut off all fuel.

Conversion of the burners from oil to natural gas is to be made in the near future, since gas has recently been made available at Joanna. When this installation is completed, change from gas to oil or from oil to gas can be made in half an hour, enabling the boilers to be fired with either fuel as supply or price indicates. Two Apex CO_2 recorders and indicators, by Uehling Instrument Co., are also on order.

Fuel Supply

Oil is stored in two tanks with a capacity of 40,000 gallons. In cold weather it is necessary to heat the heavy oil in the storage tanks, and this is accomplished with a steam coil about 2 ft in diameter, with the suction pipe mounted right in the center of the coil. This method makes it unnecessary to heat the entire tank. Hot oil can be pumped 15 minutes after the steam is turned on, making it convenient to change tanks rapidly. Steam is also available to tankers arriving with a supply of cold oil.

Two suction pumps with strainers and controlled steam jackets for further heating of the oil are equipped with valves so arranged that either pump can be used while the other is being cleaned and adjusted, with the boilers still in service. Sludge formation is prevented by the addition of 5 gallons of Nalco SR-155 Fuel Oil Treatment per 5200 gallons of oil.

The amount of oil in storage can be quickly determined by inspection of the Petrometer liquid depth indicator inside the plant.

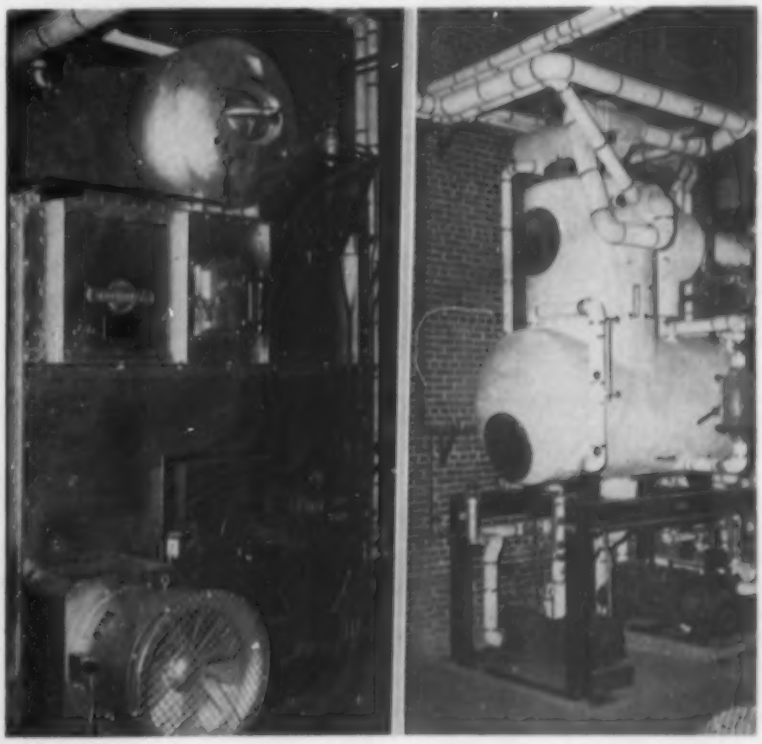
Principal Equipment in Boiler Installation

Boilers	Two—Erie City, type V-L, water tube boilers, each of 2601 sq ft heating surface including waterwalls; 16,000 lb/hr; 250 hp at 100%
Burners	Todd Rotary Fuel Oil Burner, type RAH, with Minneapolis-Honeywell Modulating Pressuretrol. Units for conversion to Todd "RotoPress" on order, to enable use of either gas or oil
Blowers	L. J. Wing Mfg. Co.
Exhaust Fans	American Blower Corp.
Combustion Control	Combustion Control Corp., FireEye
CO_2 Recorders	Uehling Instrument Co., Apex
Draft Controllers	Hays Sequence Furnace Draft Controller
Sludge Control	Nalco SR-155 Fuel Oil Treatment
Oil Level Indicator	Petrometer Corp., depth indicator
Water Columns	Reliance Gage Column Co.
Piping & Valves	Dillon Supply Co.
Boiler Feed Pumps	Worthington Corp.
Soot Blowers	Vulcan model P-3, 2½ in. rotary head
Feedwater Heater	Cochrane deaerating heater, tray type
Feedwater Regulation	Copes regulator, type BL
Pump Governor	Copes, type SLDG
General Contractor	Dillon Supply Co., Raleigh, N. C.

Feedwater System

Water for the boilers is obtained from two sources: the city water supply and a 1,000,000 gallon reser-

(*Continued on page 72*)



View showing the front of one of the new boilers. The Cochrane deaerating heater, right, is mounted above the boiler feed pumps.

Highlight report . .

Carolina Electrical Conference

Edwin W. Winkler (second from left), associate professor of electrical engineering at N. C. State College is demonstrating a new type of ammeter to **Russell Ranson** of Ranson, Wallace and Company, Charlotte, N. C.; **H. A. Dameron** of J. P. Stevens Co., Inc., Greensboro, N. C.; and **L. F. Lawrence** of Minneapolis-Honeywell Regulator Company, Charlotte, N. C.

By JOHN F. LEE, SP&I Consultant

Professor of Mechanical Engineering
North Carolina State College
Raleigh, North Carolina

OVER 200 engineers and technical personnel from textile mills in the Southeast assembled in Raleigh, N. C., in late November for a Conference on Electrical Equipment for the Textile Industry.

The conference, now an annual event, was sponsored jointly by the North Carolina Section of the AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS and the Schools of Engineering and Textiles of NORTH CAROLINA STATE COLLEGE. This year's conference was devoted to electronic equipment and maintenance of electrical equipment.

TEN topics were discussed at the Raleigh, N. C., conference, ranging from an outline of industrial electronics by **Dr. G. B. Hoadley**, Head of the Department of Electrical Engineering at **North Carolina State College**, to procedures for trouble-shooting motors and control equipment presented by **H. S. Colbath**, Plant Engineer, **Bibb Manufacturing Company.**

Although the conference was aimed at electrical problems associated with the textile industry any engineer concerned with electrical equipment could reap a harvest of useful information. This fact was clearly demonstrated by the considerable number of persons attending the conference from outside the textile industry.

Electronic Controls

C. E. Robinson and **R. J. Farrell**, of the **Reliance Electric and Engineering Company** of Cleveland, Ohio, made a plea for increased productivity and improved quality through better integration of the control functions of electrical equipment in multiple-section continuous process machines. They predicted future technological advances in the use of controlled adjustable-speed drives for individual operations in continuous processes.

The role of electronics in closer control integration was pointed out by the fact that the substitution of an electron tube for a rheostat permits control of large blocks of power with virtually no effort. Thus all functions of a drive can be made immediately responsive to extremely feeble signals given by devices designed to sense temperature, pressure, humidity, speed, and torque changes.

Electric Radiant Heat

Russell Ranson of **Ranson, Wallace and Company** of Charlotte, North Carolina, presented the results of engineering tests and economic studies conducted at Duke University on radiant heaters in process drying. It was shown conclusively that the popular notion that electric heat is expensive, and therefore operating costs are prohibitive when electric heat is used in drying processes, is not justified by the facts. Ranson's report gives figures to show that far-infrared radiant heat is a useful tool and, when full advantage is taken of design and application information, operating costs are competitive with the cost of other sources of heat. Furthermore, initial investment and space requirements are considerably less when far-infrared radiant heat is used plus the advantages of better control

and more consistent and dependable results. Ranson predicted a tremendous swing toward the use of electric radiant heat in a wide variety of applications.

Electronic Control Equipment Maintenance

C. R. Hyder of **Burlington Mills Corporation**, Burlington, North Carolina, and **H. A. Dameron, Jr.**, of **J. P. Stevens Company, Inc.**, of Greensboro, North Carolina, spoke on the maintenance of electronic control equipment. Dameron made a strong appeal for better components specially built for industrial equipment rather than the relatively light components widely used today, which appear to be more suitable for radio and television work. The following recommendations were urged on industry:

(1) sealed plug-in type relays;
(2) heavier terminal strips for rigid group mounting of resistors, capacitors and other small components;
(3) heavier terminal blocks to accommodate 12 or 14 external wirings; and
(4) improved enclosures, particularly with equipment on hinged brackets for full accessibility to all components while the equipment is in operation.

Designed To Reduce Maintenance Costs

Alan W. Frankenfield of **E. I. du Pont de Nemours & Company** of Wilmington, Delaware, discussed design considerations for reducing maintenance costs. He stressed the importance of preparing proper specifications based on a logical procedure in which (1) the facts are established, (2) the scope of the work is clearly defined, and (3) the work is planned and scheduled. Particularly significant was the establishment of the facts, which in addition to determining the extent of electrical requirements such as power, heating and lighting also includes a consideration of such hazards as corrosion, vibration, electrolysis, contamination, explosive or flammable vapors, dust or lint, moisture, high ambient temperatures and protection of equipment against operators' errors.

To reduce maintenance costs the specifications should provide the following preventive measures for the various categories of hazards.

(1) Corrosion — Use of oil-immersed lighting and power panels, starters and push-buttons; properly sealed and ventilated control rooms; extra dips and bakes on motors, transformer windings, and operating coils; use of TENV and TEFC motors; vapor-proof lighting units; special wire and cable insulation; use of aluminum, fiber or hot dipped galvanized conduit; use of neoprene latex paint for shunts and moving connectors; clear varnish and/or rubber paint on exposed copper parts; elimination of oxide compounds on contacts; and special plating of current carrying parts.

(2) Vibration—Special bracing of motor windings for X-line starting; dynamic balancing of motor driven equipment; adequate foundations for equipment; special lamp bulbs and flexible mountings for lighting fixtures; and resilient mountings for equipment to eliminate false or improper operation of relays and coils.

(3) Electrolysis—Proper bonding and neoprene jacketing of lead covered cable.

(4) Contamination — Aluminum or plastic conduit, enclosures, lighting fixtures where ferrous materials will contaminate the product. (Steel must be taped with varnish cambric and painted, thereby providing a source of increased maintenance.)

(5) Explosive or Flammable Vapors—Use of oil immersed lighting and power panels, starters and pushbuttons; properly sealed and ventilated remote control rooms; vapor-proof lighting units; and explosion-resisting equipment.

(6) Dust and Lint—Lint and dust tight enclosures; lintproof and TENV or TEFC motors; and adequate ventilation.

(7) Moisture — Vapor-proof lighting; extra dips and bakes on motor windings; splashproof or TEFC motors; remote control room; special wire and cable insulation; weatherproof enclosures; space heaters in equipment to eliminate condensation; control of atmospheric moisture; and prevention of mildew or fungus growth by draining and venting of conduit and equipment.

(8) High Ambient Temperature — High-temperature insulation; ventilation to reduce temperature;

Some of the Carolina Electrical Conference Speakers

BACK ROW—**George B. Headley**, head of electrical engineering, N. C. State College, Raleigh, N. C.; **C. E. Robinson**, Applied Engineering Dept., Reliance Electric and Engineering Co., Cleveland, Ohio; **L. F. Lawrence**, branch manager, Minneapolis-Honeywell Regulator Co., Charlotte, N. C.; **C. R. Hyder**, chief electrician, May Hosiery Plant, Burlington Mills Corporation, Burlington, N. C.; and **V. F. Sepavich**, Crompton and Knowles Loom Works, Worcester, Mass.

FIRST ROW—**J. Dan McConnell**, plant engineer, Cone Mills Corporation, Greensboro, N. C.; **A. W. Frankenfield**, senior electrical engineer, E. I. duPont de Nemours, Wilmington, Del.; and **H. S. Colbath**, plant engineer, Bibb Manufacturing Co., Macon, Georgia.

Carolina Electrical Conference (continued)

derating of equipment; and special lubrication.

(9) Protection Against Operators' Errors—Signals and alarms; interlocking; simplified controls; and safety and limit switches.

(10) Miscellaneous—Surge and lightning protection for outside lines; surge protection for rotating equipment; proper insulation; proper grounding of equipment; primary and secondary breakers with proper interrupting and current carrying capacity; protective relays with proper settings; pre-sealed bearings on inaccessible motors; dry-type transformers; drawout breakers and motor control centers with drawout units; proper torque motor application; equipment designed for excessive current breaking; proper starting equipment to eliminate belt slipping and shock to mechanical parts; overspeeding control for rotating equipment; ventilation of fluorescent lighting fixtures; and fireproofing cables in manholes and vaults.

Plant Trouble-Shooting

Abstract of comments by H. S. COLBATH, plant engineer, Bibb Manufacturing Company, Macon, Georgia.

PROBABLY the most common electrical trouble in many industrial plants is the blown fuse. It has been my experience that where fuses are used, trouble-shooters invariably look for this trouble first. Where air circuit breakers are used ahead of the starter, the breaker is checked to determine whether it has tripped.

If the breaker has tripped and when reset trips out immediately, the trouble-shooter should test for a short or ground, either in the circuit or in the motor. In case of the blown fuse, the trouble-shooter should be trained to examine the fuse housing or case, as in many instances the fuse and/or case offer a clue as to the cause of the trouble.

1. If a **loose contact** caused the trouble, the fuse contacts will be oxidized and dull—due to air getting to the contacts, resulting in overheating.

2. When only one end of a fuse is oxidized, it is a positive indication of **loose fuse clips.**

3. The oxidization of, or discoloration of the bottom contact on a plug type fuse indicates that the **cap was not screwed down tight.**

4. Washer or end ring on a ferrule contact fuse burned or partially melted indicates that the **cap was not screwed down tight.**

5. Charring of the ends of fibre tubes on one-time fuses or renewable fuses indicates **inadequate contact.**

6. With a renewable fuse, the link will usually blow at one end if there is a **loose contact** at that end.

7. If a renewable fuse link blows in the center, this indicates that the contacts were good and the fuse blew due to **light overload.** In this case, replace the fuse and check the current on each motor phase with your clamp-on meter. If the current registered is greater than the motor nameplate amps, look for overloads.

8. A clean blow at either end of the link of a renewable fuse may be caused by **poor contact,** but usually is indicative of a **normal blow.** Check fuse rating against ambient temperatures.

9. A non-renewable fuse link will blow in the middle of the line when performing its designed function, i.e., protecting against overloads; while it will blow at one end when failure is caused even in part by a **poor fuse contact.**

10. When renewing any fuse, be certain that you use the proper size fuse as an arc may result causing serious harm to personnel and equipment.

Control trouble may be divided into two classes — acute and chronic.

Both types present the same problem and the trouble-shooter should have his tools ready for service at all times. He should also have a simple diagram of all circuits handy and an essential part of his training should be the study of all electrical circuits in his plant. Manufacturers of control apparatus usually provide an elementary diagram with each control. This diagram should be kept with the control.

If any trouble becomes chronic, send the manufacturer a sample of the damaged or broken parts and give him all information possible, including nameplate date, nameplate data of machine on which control is used and how used. Other helpful information will include voltage and frequency, length of time equipment has been in service, manner in which trouble occurs. If you have any opinions as to the cause of trouble, pass them along, as the manufacturer can oftentimes obtain an excellent lead from your experience.

Electronic Controls for Humidity & Temperature

Adapted from comments by L. F. LAWRENCE, branch manager, Minneapolis-Honeywell Regulator Company, Charlotte, N. C.

THE AUTOMATIC control industry has been presented a challenge to design and develop controls and control systems which will be capable of sensing and correcting for changes which make for inefficiency.

For example, higher temperatures, which result from increased lighting, faster and larger machinery, and lower humidity, reduce a man's willingness to work, his capacity to work, and his mental alertness, making him more vulnerable to accident and more prone to absenteeism. Changes in temperature create expansion and contraction of metal parts, destroying precise adjustments, and cause product rejects. Management has a direct concern with men, machinery, and materials, in establishing the necessary levels and tolerances of atmospheric conditions in textile mills and many other industrial plants.

Early efforts to raise the humid-

How to make certain your pipe hanging jobs are

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ity in the textile industry included wetted floors, vapor pots, hand fans, etc. Later, atomizers and window fans were developed, and still later the central station conditioning. A variety of hygroscopic measuring elements have been used to control humidity: tobacco leaves, cotton, wool, skin, paper, wet bulb, and hair. They all work to a degree, but require maintenance because of fatigue, exceed their elastic limit, or are sluggish to the point of being non-sensitive within the limits now being asked for.

Relative Humidity

The electronic hygrostat, which has been on the market about four years now, is capable of operating to hold plus or minus ½% relative humidity. Its usual application is control of atomizer sprays in individual zones or areas of the air conditioning space.

This electronic hygrostat system uses a bridge circuit, and is made up of two main units, the measuring element and an electronic relay. In each unit are two legs of the bridge circuit. The measuring element, or hygrostat, contains a fixed resistance plus a rheostat (which is used for control point adjustment), as one leg, and a sensing element as the second leg. This element is the heart of the system.

As the element takes moisture from the air, on an increase in relative humidity, the resistance in the element decreases. As the moisture level decreases, the element quickly gives up moisture, and the resistance increases. As the resistance changes, small changes in voltage are produced across the bridge leg in the measuring element. These voltage changes are sensed by the electronic relay which contains the other two legs of the bridge circuit and the vacuum tube circuit. This circuit amplifies the voltage changes to sufficient strength to energize a relay which closes a circuit to the humidifying, or in some cases, the dehumidifying equipment.

In operation, when the space relative humidity is equal to the set point of the hygrostat, the relay is de-energized and the system is in balance. When the space relative humidity changes, the resistance of the element changes. Either more or less voltage is dropped across the element and the midpoint of the hygrostat side of the bridge circuit is at some potential other than half the applied voltage. Since the midpoint of the other side of the circuit (in the relay) remains constant because of a fixed resistance, there is now a potential difference between the midpoints of each side of the circuit. When this difference exists, a signal is sent to the relay where it is amplified and then fed into the discriminator stage of the vacuum tube circuit. The discriminator stage senses whether more or less voltage is being dropped across the element. On a humidification application, such as atomizers in a weave room, the relay opens the circuit to the atomizer valve when the humidity is low and the voltage drop increases across the element.

It is necessary to maintain a constant condition of air which leaves the washer, known as the dew point temperature. This is when the wet and dry bulb are equal, the relative humidity being 100%. This dew point air is introduced to the space where the internal load, due to lights and machinery, etc., elevates the dry bulb to the desired level and causes the wet bulb and humidity to go down to approximately the desired level.

Since the system is designed for maximum load condition, we must have a **flexible control system** to meet conditions where the load is reduced. So zone controls are added to take care of zone area load changes. These controls maintain the final space condition, and reflect the effect of changes if they occur in the washer, if it is not held constant, plus the zone changes.

Since a change in dew point temperature of only ±½ deg F can change the relative humidity about 2% in the space, if we do not hold the dew point constant, the zone controls are practically worthless. They must correct for this change plus the zone changes and if the design required ±1% and ±2 F in the space conditions, or less, this condition cannot be met. If we put a quality control, such as the electronic potentiometer, in control of the dew point, we can hold it constant, so the zone controls have only to correct for changes in the space conditions.

The function of **automatic reset** in the control action is one which will allow a constant temperature to be maintained under a no-load condition in the washer or a full load condition in the washer. It may be compared to an automobile being driven at thirty miles per hour on a level road. On a decrease in load, such as down grade, the accelerator pedal is released by the foot in order to hold thirty miles per hour. Or, if the load is increased, such as going up-grade, the accelerator pedal must be pushed down to hold thirty miles per hour. So to hold thirty miles per hour the accelerator may be in any position from no pressure to fully depressed, depending on the load, and the corrective reset action is made by the foot to increase or decrease the output capacity of the engine. Similarly, the automatic reset function will vary the washer capacity from 0 to 100% if necessary to hold a constant leaving air condition.

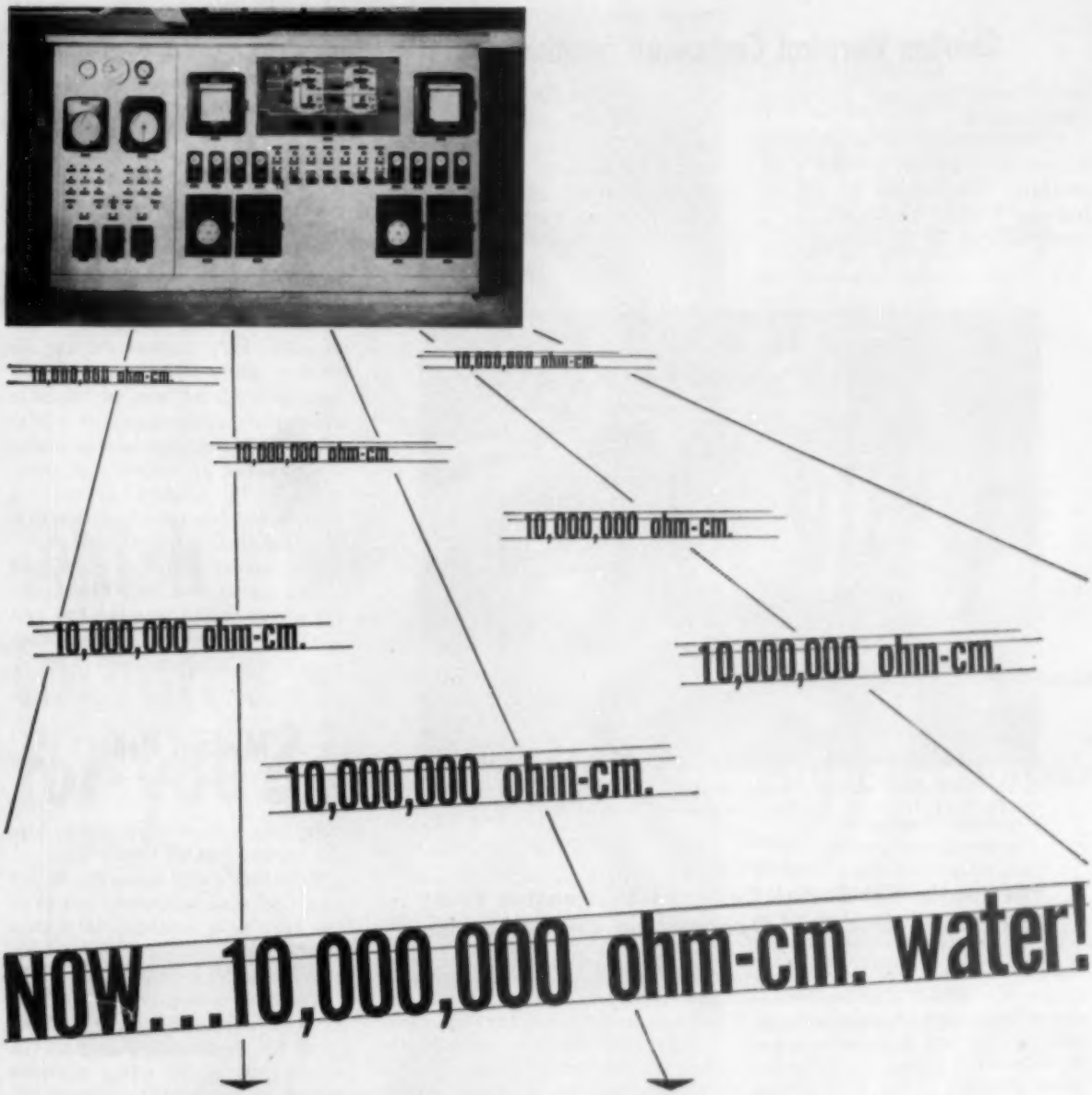
This controller has been applied on some 1000 installations. Its small mass provides great sensitivity, it has no moving parts, and is not affected by fatigue.

The limitations of the application of this control are: 1. Ambient temperature range: +40 to +130 F. 2. Humidity Range: 31 to 93% R. H. 3. Calibrated Sensitivity: ±½%.

Temperature Control

Temperature control for air conditioning must be sensitive, accurate, and stable.

In the past, we have used the controls already developed, even though pressure filled thermal systems could not give the degree of control the plant expected to get. But now we turn again to electronics for responsible control. For dew point control, we usually select an electronic recording potentiometer with full adjustable



at 160 gpm for 2050 psig boilers... by Demineralization

Just a few years ago, producing large quantities of water of a purity of 0.01 ppm was quite a chore. A tedious, drawn out multiple distillation technique was required. Engineers "dreamed" of producing this water at large flow rates for high pressure boilers and power plants by an easier and more economical method.

Today, at the Pennsylvania Electric Company, Shawville Station, this has become a reality. Makeup for 2050 psig boilers is produced at a rate of up to 160 gpm and with a purity of 10,000,000 Ohm-cm (0.01 ppm) and **less than 0.02 ppm silica** by a fully automatic Graver Mixed-Bed Demineralizer with in-built dependability.

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A Division of Graver Tank & Mfg. Co., Inc.
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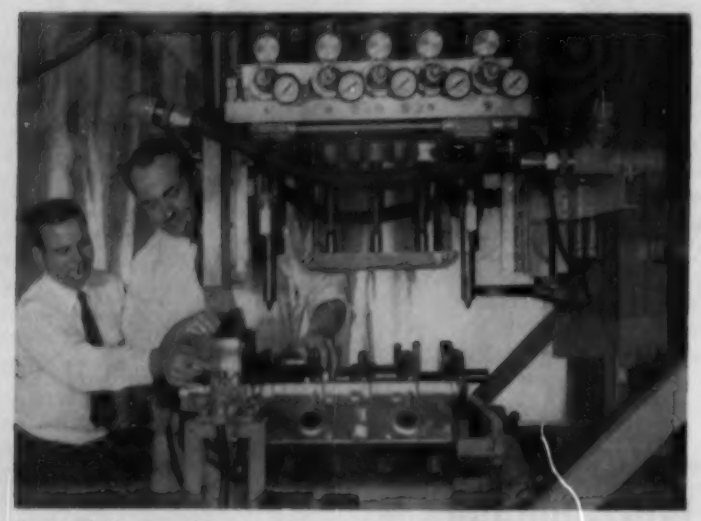
Carolina Electrical Conference (continued)

proportional band and automatic reset control.

A potentiometer is an electrical instrument, which, in this case, measures temperature by balancing an E.M.F. developed by a thermocouple or a voltage drop across a resistance bulb against a known voltage supplied from a battery. The known voltage is varied by movement of a contactor along a slidewire across which the battery voltage is impressed. The position of balance is reached when the two opposing voltages are equal and no current flows in the balancing circuit. Since the E.M.F. of the measuring element has a definite value for each temperature, the position of the contactor along the slide wire can be calibrated to read directly in temperature. The electronic potentiometer provides three basic functions: conversion, amplification, and rebalance of the circuit.

The quality of control mentioned above can be shown by application to a central station air washer system. Here, outside air and recirculated air, in variable quantities, is introduced as a mixture into the washer section where it is heated or cooled and saturated by the washer sprays to a preselected dew point temperature. It passes through eliminator plates where excess moisture entrained in the air is removed. From here the air is pulled into the fan and pushed into the distributing duct system to the space.



C. H. Elliott, Cleco Manager; Roger Winship, Cleco Salesman; and the Ten Spindle Electro-Pneumatic Nutsetter, designed and built by the Cleco Division, Reed Roller Bit Company.

Pneumatic Nut Setter Designed by Houston Firm; Fully Automatic Tool Operates on Conveyor Line

A machine which will automatically set ten bolts on a V-8 automobile engine cylinder block has been designed, manufactured and delivered to a major automobile manufacturer by the CLECO DIVISION of the REED ROLLER BIT COMPANY, HOUSTON, TEXAS.

The device, a Ten Spindle Electro-Pneumatic Nutsetter, is fully automatic and requires no operators. The nut running unit is powered by ten air motors and is self-supported by a steel framework which straddles the assembly line conveyor. With a capacity of 2000 bolts per hour, the machine is a complete unit package requiring only the hooking up of electric and air connections to be put into immediate service.

Engine cylinder blocks are spaced out on the conveyor which never stops during the nutsetting process, as the nut running unit slides on its framework guides at a corresponding pace with the block. As the block reaches the Cleco product, it is centered by fences and rollers, and then triggers the mechanism into motion. The nut running unit lowers and is accurately positioned by pilot pins which fit into holes in the cylinder block. The nut runners, powered by ten air motors, set the bolts, automatically cutting off when stalled at torque.

After the proper time has elapsed, a switch shuts off air to the motors which are bled of air to relieve pressure on the sockets and the overhead cylinder withdraws and returns the unit to the starting position in time for the next cylinder block.

In the initial contact, if the pilot pins don't find the seating holes true, triggers in the pin nose actuate machinery to withdraw the unit from that particular cylinder block. As no manpower is needed to supervise the machinery in operation, if trouble occurs, safety mechanism disengages connections, stop the conveyor and set off an air horn and colored lights to summon help.

Modern Boiler

(*Starts page* 64)

voir, which assures an ample supply of water at all times.

Condensate and make-up are fed to a Cochrane deaerating heater of the tray type, mounted on a steel frame above the steam and electric feedwater pumps.

Constant water level in the boilers is maintained through a Copes type B1 feedwater regulator. A Copes type SLDG pump governor maintains a constant pressure difference between the boiler and feed lines. Water columns are by Reliance Gauge Column Co.

Results

Joanna's boiler installation has proved satisfactory in every way. Considerable savings have been realized from greater efficiency, minimum maintenance, and reduced labor costs over the old hand firing method. Labor costs were reduced by $9,600 the first year. Steam costs were 0.2742 cents per pound of cotton processed for the old boilers, compared to 0.2415 cents for the new installation—a saving of nearly 12%.

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The Dimensions of an Effective Plant Manager . . . . . .

Part 2

MAINTENANCE

There are three main divisions of plant management. Mr. Pounds discussed OPERATION in our January issue. MAINTENANCE is covered here, and SUPERVISION is scheduled for a coming issue.

By TRUMAN E. POUNDS
Superintendent No. 2 Power Plant
The Dow Chemical Company
Freeport, Texas

THE point of diminishing returns in a plant maintenance program will probably never be clearly defined. Some plants may have a policy of periodically inspecting various types of equipment, while others may only open up a piece of machinery after it fails or gives trouble. Maintenance is big business and, if not properly handled, it may be one of the most costly items in the operation of a plant.

Maintenance Organization

Establishing a good maintenance organization offers several problems and possibilities because there are many effective means of providing such services. Your plant may have its own complete crew of talented repairmen operating directly under the plant manager or there may be a central company maintenance shop out of which craftsmen are requisitioned to work in the plant on a monthly or job basis, or both. Still another way to handle repair jobs is to contract them out to contractors specialized in this line of work.

We find it most effective, in the writer's company, to draw craftsmen from a centralized maintenance shop, both on a monthly and job basis. Our policy is to requisition so many boilermakers, pipefitters, etc., each month after maintenance plans are completed. These men make their personal headquarters in the plant during this period and actually work directly for us; however, for administration, personnel records, training, promotion and pay purposes, they are still carried on the shop's books.

Each requisition is closed out at the end of the month at which time a total accounting of the man hours worked, material requisitioned from the central stockroom and total craft cost is submitted to the plant manager. Thus, cost accounting is made very easy. The policy is for the plant manager to requisition each month almost enough craftsmen and helpers to take care of the bulk of the routine plant maintenance work. This, of course, means that other requisitions also have to be written to take care of special work or large overhauls.

In theory this policy allows us to keep all men, requisitioned on a monthly basis, busy one hundred per cent of the time. Actually, this method of supplying maintenance labor works out very well since, for all practical purposes, men so requisitioned each month make their headquarters at the plant, year in and year out, providing, of course, that their work and attitudes measure up to our satisfaction and that they are happy on the job. If for some reason we are not pleased, it is only necessary to tell the shop superintendent to send us a replacement. This takes all craftsmen personnel problems off of our hands.

Better Utilization

Using this method also makes for better utilization of large machinery tools by making the central shops available for company wide work. If the craftsmen so requisitioned on a monthly basis are properly directed by understanding and intelligent plant maintenance supervisors, they soon think of the plant in which they are working as their home, thereby developing a very high esprit de corps for their jobs. We have had such good luck with our requisitioned personnel

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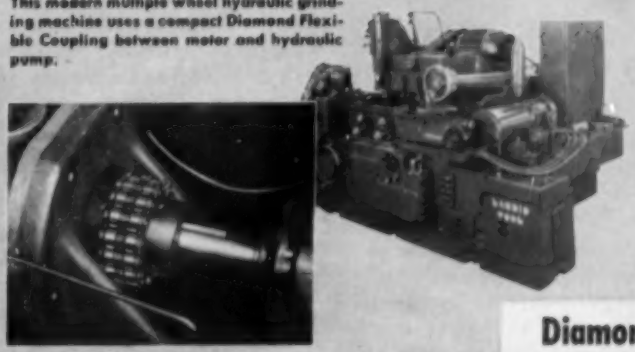
This modern multiple wheel hydraulic grinding machine uses a compact Diamond Flexible Coupling between motor and hydraulic pump.



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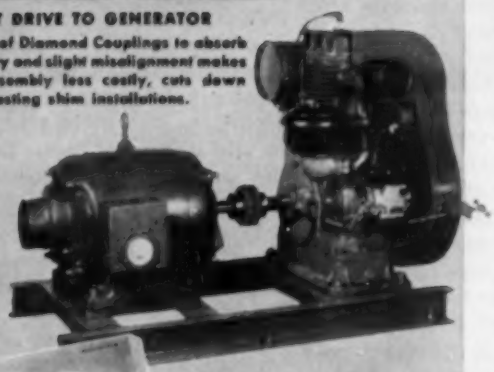
Ability of Diamond Couplings to absorb end-play and slight misalignment makes unit assembly less costly, cuts down time-wasting shim installations.



Bulletin No. 19 contains complete data for the selection of Diamond Flexible Couplings from fractional to over 600 horsepower. Your copy will be sent upon request.

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Dimensions of a Plant Manager (continued)

Maintenance is big business. It can be a very costly item in the operation of a plant.

that one of our craftsmen recently turned down a job as a crew leader just to stay in the plant.

Planning and Scheduling

Assuming now that you already have an established crew of maintenance craftsmen, the next concern will be how to most effectively plan and supervise their work. Some small plants may have only one man supervising and being responsible for all work, but there are actually very few engineers who are versatile enough to cover and effectively plan all phases of electrical, mechanical, and instrumentation maintenance.

Our experience has been that better results can be obtained where one engineer is assigned to supervise each of these three divisions of the work. Each engineer is directly responsible for secondary planning with respect to his own division. Thus, the electrical engineer is responsible for planning the work for the electricians each month, and for coordinating his jobs with those of the engineers responsible for mechanical or instrumentation work.

The Assistant Superintendent or Assistant Plant Manager also acts as maintenance coordinator and consultant. In this capacity he can assure complete coordination between the three divisions of work.

Economical planning and scheduling of the necessary inspections and maintenance jobs is important. Some plant managers may go so far as to open each piece of equipment once a year for examination. Others take the attitude that as long as the unit is operating properly and maintaining its normal pressure, temperature and load, it should be left alone. Actually, the regularity with which a piece of equipment is inspected internally may depend upon local, state and national laws, insurance company requirements, past experience with the machine or similar equipment, operating performance, atmospheric conditions, load factor, manufacturer's recommendations, available money for maintenance, and just plain judgment.

Most states now require that all boilers be inspected at least once a year by state boiler inspector. Turbo-generators can be set up on a one, two, or three year inspection program, depending upon the age, past performance of the machine, amount of carry over of the boilers and the load factor. The work on auxiliaries serving both boilers and turbines will normally be scheduled to take place while the major unit is undergoing overhaul.

The maintenance schedule for other items such as air compressors, feed pumps, tanks, switchgear, bus work, meters, steam and condensate lines, water treating plant facilities, etc., are based on experience and past equipment performance. These constitute the only really practical knowledge on which plans for outages and maintenance inspections may be based.

Since we are no longer confronted with war-time necessity of keeping all equipment in service and fully loaded for an indefinite period, or until it breaks down, it now seems to be generally agreed that at least some form of scheduled preventative maintenance program is not only necessary but economical. Here again there are many and varied ways of operating such a program. Some managers like to have a tickler file to remind them of when and what to do. Others only think it necessary to rely on their own memory.

Charts Aid Planning

We have found carefully developed scheduling charts are most effective in properly planning our work. These charts also keep the centralized maintenance shop sufficiently alerted so that they can more effectively deploy their available man power.

Using the information available from monthly, annual and special overhaul reports, machinery history record cards, and past experience, the plant manager prepares annually, a general maintenance schedule for his entire plant. The plan can very effectively be drawn up for reproduction in bar graph form on one or more pieces of 11″ by 17″ graph paper.

If items of plant equipment are listed as ordinates and the weeks and months of the year as the abscissa, it will then be very easy for the maintenance supervisors to pick off the items which should be inspected during the month when drawing up their own secondary work plans. For easy reference the charts should be made so that the inclusive inspection dates will be blacked in to the right of the listing of the equipment. The manager will, of course want to reproduce this master schedule for distribution to his assistant, maintenance supervisors, maintenance crews, central maintenance shops and to his immediate superiors so that all concerned will be fully informed of the overall plan.

Monthly Work Schedule

Using this master as his guide, each maintenance supervisor should draw up his own maintenance work schedule prior to the first of each month. This secondary plan should include all major items marked for inspection by the manager, items of an emergency nature, and minor repairs which represent small expenditures. The use of a ditto form for the listing of work items in the secondary maintenance schedule should prove very effective.

In addition to the jobs to be accomplished, the form should also have check columns for indicating the operating account which is to bear the cost, the craft or crafts involved, and whether the work is to be done by special work order or by the men requisitioned on a monthly basis.

The completed pencil form should then be submitted to the plant manager and his assistant for approval, after which it can be typed and distributed to those craftsmen, supervisors and departments affected.

Using this type of planning, we have found that everyone is informed of what is expected and

"33,000 HOURS proved the choice was right!"

When a prominent North Carolina community converted its power plant to diesel operation, it called in Sinclair Lubrication Engineer Jim Holt for his recommendations on proper lubricants.

Mr. Holt reports, "I recommended Sinclair RUBILENE®. My previous experience convinced me that this diesel lubricating oil would provide maximum wear protection for this power plant's six 1000 K.W. diesel engines. RUBILENE also guards against sticking rings and prevents excessive wear of cylinders, pistons and other moving parts operating continuously for long periods.

"RUBILENE was the right choice," Mr. Holt continues. "After 33,000 hours of near-continuous operation, bearings show very little discernible wear – and there's not a sign of erosive or corrosive action. *Oil consumption is remarkably low,* considering the prolonged operating hours under overload. All six 1000 K.W. engines, with a total output of 6400 K.W. per hour, *use a total of only 1 barrel of oil a day!*"

Why not give a Sinclair Lubrication Engineer the chance to help solve *your* lubrication problem. *There's no obligation.* Contact your local Sinclair office or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR DIESEL LUBRICANTS

Dimensions of a Plant Manager (continued)

Experience and past equipment performance constitute the only really practical knowledge on which planned outages for inspection and maintenance may be based.

the permanently assigned craftsmen can more effectively utilize their own time since it is not necessary for them to look up their maintenance supervisors for a new assignment at the completion of each job. When operating under such a plan, the plant manager can know how economically he is utilizing his maintenance dollars. It has also been our experience that, to a large extent, costly breakdown overhauls will be eliminated since minor troubles, corrosion, etc., will be corrected before they become major.

No maintenance program would be one hundred per cent effective without some method of collecting, reporting, and filing repair and inspection information. These vital functions will be covered under the next topic.

Records and Reports

Just recently I read a statement in some publication to the effect that if government, industry and business continued to circulate paper at the present rate, and each letter or report was filed by the recipient—then by the year 2000 A.D. all the people in the world would have to move out to make room for necessary filing cabinets. In contrast to this, one practical operator remarked to the writer that he did not need a filing cabinet or brief case to carry his brains in; that he could carry all his information in his head. Obviously, there is some practical, happy medium between these two extremes—a solution which will assure the plant manager that he does have proper information in his file for ready reference.

There are probably very few cases on record where any two plant managers thoroughly agree on which reports are necessary and which are not essential. The writer is no doubt also very biased in his own opinion on the subject because if he were not, this paper would never have been written. A listing of records and reports which we therefore feel are an absolute necessity include the following:

1. Daily, weekly, or monthly operating report.
2. Personnel time and attendance cards.
3. A general descriptive monthly operating and maintenance report.
4. Monthly cost analysis.
5. Special large equipment inspection and overhaul reports.
6. Machinery history cards.
7. Personnel records.
8. Personnel accident reports.
9. Equipment performance records.
10. Purchase orders and material requisition records.
11. A complete set of blueprints covering the plant.
12. An adequate filing system.

To be complete, this paper should thoroughly discuss each of these records; but such a treatise becomes a voluminous book. Since the writer does religiously believe, however, that operations cannot possibly be economical or effective without proper records and well arranged files, a few timely comments concerning various reports are certainly necessary before leaving the subject.

A daily, weekly, or monthly operating report should show total unit or train production figures, metered quantities of raw materials supplied to each unit or train, unit or train operating efficiencies, metered distribution of products, and various important control pressures and temperatures whose variation may cause an increase or decrease in plant or unit efficiency. Personnel time and attendance cards are of course also necessary for pay purposes, vacation credits, sick leave credits, jury service, absenteeism and tardiness.

Machinery History

When was pump No. 1 last overhauled? How did it look internally when inspected? How often should it be opened? How often have we lost an inboard bearing on No. 2 pump? Answers to such questions are definitely essential if maintenance dollars are to reflect value received. It should be the plant manager's practice to so utilize the general descriptive monthly operating and maintenance report, special large equipment overhaul and inspection reports, and maintenance and machinery history record cards to readily supply this information in a cross filing system.

How Reports Work

Writing of the general report should be the manager's own responsibility. Information concerning operation, maintenance and specific troubles should be jotted down on a daily reminder calendar every working day. This data can be obtained from personal observation, memos from maintenance supervisors, craftsmen machinery inspection cards, and from the operating report. After the end of the month, the material should then be sorted and written up in report form to be distributed to the manager's immediate superior and others, as the policy may be.

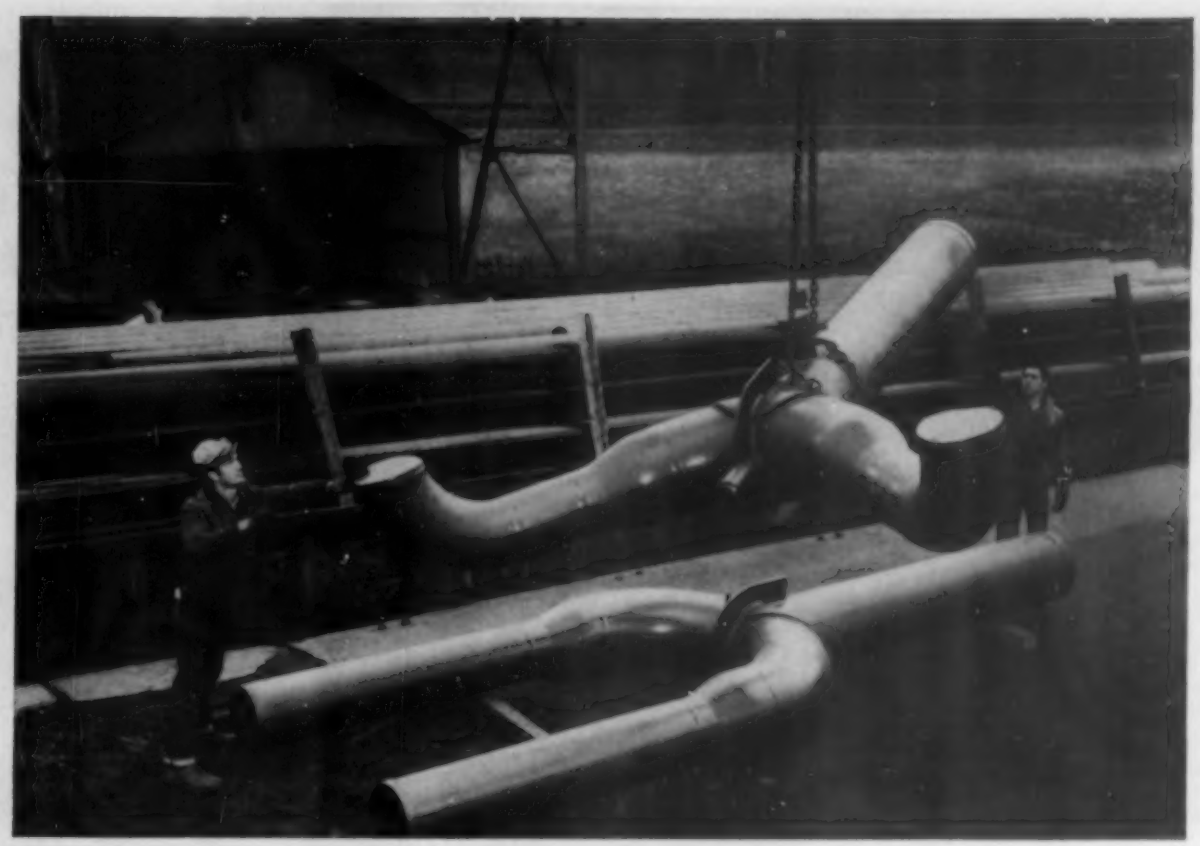
One copy of this report should always go to the plant files for future reference. The maintenance and test data for each report should then be briefly transferred to the machinery history cards, one of which should exist for each piece of equipment in his plant.

An example of such an entry would be as follows:

3-10-53. Opened No. 1 pump for complete inspection.
See monthly report for March, 1953.

Machinery history cards and special overhaul reports can be handled in a similar manner. Obviously, the need for such a special report exists when large pieces of equipment, such as turbo-generators or boilers, are shut down for

(*Continued on page* 117)



1000° hot reheat mixing chamber ...ready for shipment to Plant Hammond

This large complicated 1¼% chrome, ½% molybdenum assembly . . . completely shop fabricated by the Power Piping Division of Blaw-Knox . . . is the third unit to be shipped to Georgia Power's 300,000-kw Plant Hammond at Rome, Georgia.

It's the complex type of job that would be practically impossible to assemble in the field. For instance, it required the most modern shop facilities, as well as great skill, in the fitting and welding of the large reinforced special nozzle well . . . to insure perfect alignment and prevent distortion.

When installed, this unit will be a vital part of a power piping system which will consist of 250,000 feet of pipe, ranging in size from ¼ inch to 24 inches. Sizes 2½ inches and larger were shop fabricated . . . smaller sizes were field fabricated.

This entire system is being fabricated and erected by Blaw-Knox . . . the kind of service which is readily available to you through our Power Piping Division.

Just tell us your requirements and we'll provide the service you need.

BLAW-KNOX COMPANY
Power Piping and Sprinkler Division
Pittsburgh 33, Pennsylvania

BLAW-KNOX

POWER PIPING

To get more information on piping for industry, write for your copy of Bulletin No. 2443.

Complete prefabricated piping systems for all pressures and temperatures . . . plus complete line of functional spring hangers constant support spring hangers • rigid hanger assemblies • overhead roller assemblies • supports • vibration eliminators

"The Lower Temperature Rise of FUSETRON FUSES Solved a Serious Shutdown Problem for Us"

J. F. Getz
Chief Engineer,
University of Denver
Denver, Colorado

"The fine, new Field House we built in 1949 included an ice skating rink. The ice making equipment uses two 3 phase, 220 volt, 100 hp., compressor motors having a running current of 246 amperes.

"Ahead of the magnetic starters for these motors were two 400 ampere safety switches originally equipped with 400 ampere renewable fuses.

"Shortly after the compressors went into service heat began developing in the safety switches. The fuses were running very hot — in fact to such a degree that the links in the fuses were melting and causing as many as three shutdowns a week.

"In August of 1951 I saw a demonstration by a BUSS representative that showed how much cooler was the operating temperature of Fusetron fuses.

"Right then, I determined to try out Fusetron fuses in these two switches. To get better protection I dropped the fuse size down to 300 amperes.

"With the installation of Fusetron fuses the heating immediately disappeared and so did the shutdowns it formerly caused.

"The lower temperature rise of Fusetron fuses solved a serious shutdown problem for us."

YOU TOO, CAN MINIMIZE PLANT SHUTDOWNS AND EQUIPMENT LOSSES BY INSTALLING FUSETRON FUSES — THEY GIVE 10 POINT PROTECTION

1 Protect against short-circuits. **2** Protect against needless blows caused by harmless overloads. **3** Protect against needless blows caused by excessive heating — lesser resistance results in cooler operation. **4** Provide thermal protection — for panels and switches against damage from heating due to poor contact. **5** Protect motors against burnout from overloading. **6** Protect motors against burnout due to single phasing. **7** Give DOUBLE burnout protection to large motors — without extra cost. **8** Make protection of small motors simple and inexpensive. **9** Protect against waste of space and money — permit use of proper size switches and panels. **10** Protect coils, transformers and solenoids against burnout.

And with FUSETRON FUSES you have Greater Safety, because of their 100,000 amp., Interrupting Capacity Rating

Tests verified by the Electrical Testing Laboratories of New York show that Fusetron fuses, on loads under 600 amperes, can interrupt safely the most severe available short circuit currents.

The test circuits were set to deliver far in excess of 100,000 amperes — yet the 250 and 600 volt Fusetron fuses on each and every test cleared the circuit without igniting readily flammable material placed around the fuses . . . and there was comparatively little noise.

You get all this added safety for every set of fuse clips in your plant without changing a panelboard or switch

No Interference with time-lag

Fusetron fuses' time-current characteristic, of the utmost importance to give proper motor and electrical protection and to eliminate needless blows, has in no way been disturbed.

For High Interrupting Capacity above 600 and up to 5000 amps. — Install BUSS Hi-Cap Fuses

BUSS Hi-Cap fuses offer unlimited interrupting capacity for circuits of 600 volts or less. Their high speed operation on heavy shorts limits current to safe values. This minimizes damage to equipment and cuts down dangerous stresses on transformers.

When coordinated properly with Fusetron fuses they will not open ahead of the fuse nearest to the fault—thus the trouble is isolated to the part of the circuit in which the fault occurs.

Added Safety on Old Installations

On installations where the increase in the capacity of the circuit has outgrown the interrupting rating of the circuit breakers, BUSS Hi-Cap fuses offer a safe and relatively inexpensive way to protect inadequate breakers against rupture in event of a bad fault.

Maximum Safety

With Fusetron fuses there is no cascading of interrupting rating — no places where an excessive fault current might cause serious damage. Every Fusetron fuse has an interrupting rating in excess of 100,000 amperes.

You don't have to worry about selecting chosen spots in which to pay extra for "safe" equipment. Wherever a Fusetron fuse is installed you have safety as sure and dependable as you can buy — no matter what you pay.

No Maintenance Costs

Once properly installed Fusetron fuses are maintenance free. They require no costly inspection or down-time for calibration and other maintenance necessary on mechanically operated devices.

Dust, fumes, corrosion or age cannot prevent a Fusetron fuse from opening safely. There are no hinges, pivots or contacts to stick or slow down the operation of the fuse on short-circuit.

No Recalibration Costs

When a Fusetron fuse does blow, there is no recalibration needed. As quickly as the fault in the circuit is corrected, you slip in a new fuse that has been CALIBRATED AT THE FACTORY BY ENGINEERS — a fuse that is as safe and dependable as the one that blew.

PLAY SAFE—Install FUSETRON Dual-Element Fuses and BUSS Hi-Cap Fuses throughout the entire electrical system . . . Today!

One needless shutdown . . . one lost motor . . . one destroyed switch or panel . . . one burned out solenoid . . . may cost you far more than replacing every ordinary fuse with a Fusetron fuse on loads up to 600 amps — and BUSS Hi-Cap fuses on loads above that.

Blowing time charts and more information are available. Write for bulletins FIS and HCS.

FUSETRON
TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION
BUSS

BUSSMANN Mfg. Co.
(Division of McGraw Electric Co.)
University at Jefferson, St. Louis 7, Mo.

Please send me complete facts about FUSETRON dual-element Fuses and BUSS Hi-Cap Fuses.

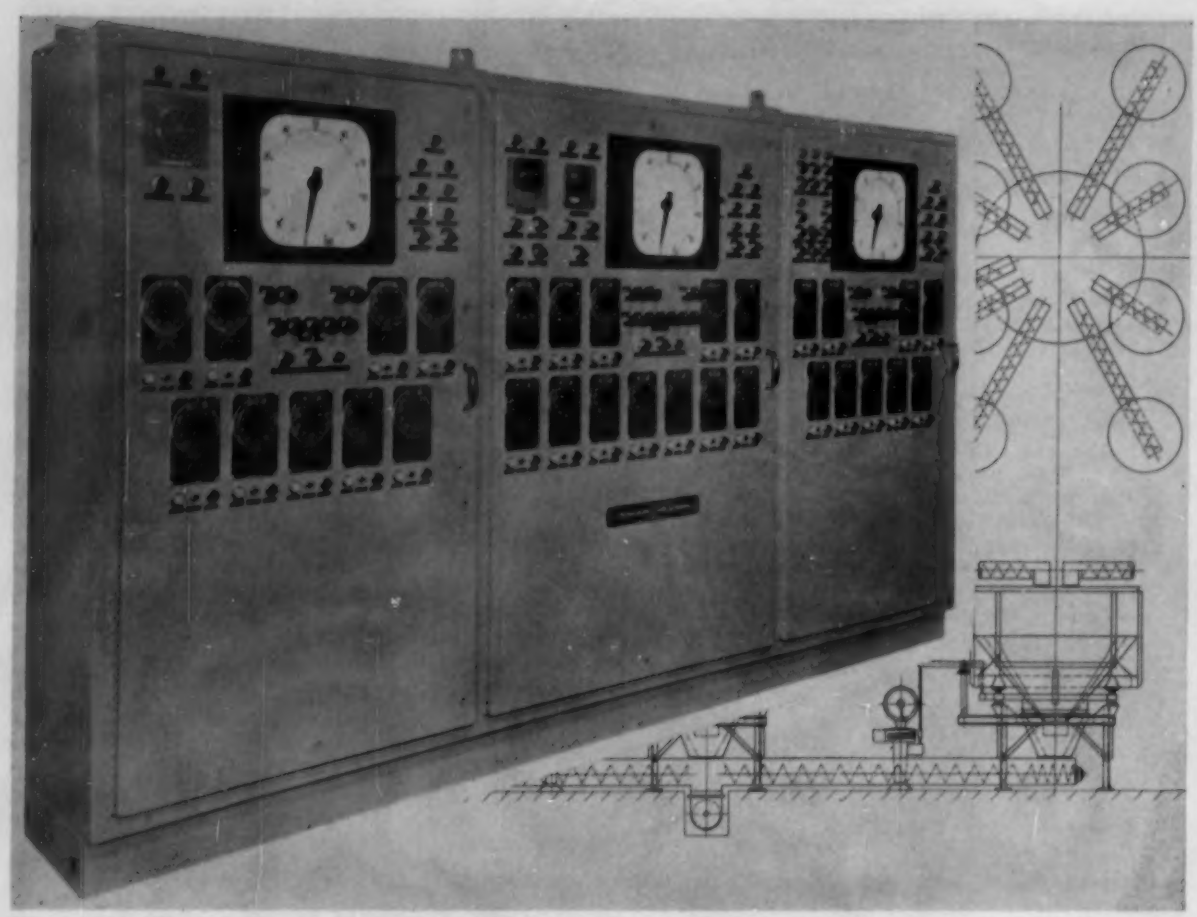
Name _____

Title _____

Company _____

Address _____

City & Zone _____ State _____



One of the three automatic hopper scales is shown at right. At the master control panel, the operator can see the progress of the cumulative weighing at each of the three hoppers.

Automatic Proportioning for Delaware Feed Mill

AN UNUSUAL automatic proportioning operation involving centralized remote control of the selecting, feeding, weighing and mixing of 30 different ingredients is in operation at the new feed mill of the Cooperative Mills, Inc., at Seaford, Delaware. Ingredients are brought from storage bins to three automatic hopper scales, and batches are discharged in unison to screw conveyors leading to two 3-ton mixers. The mixers turn out 45 tons of product hourly. The proportioning system was designed by Richardson Scale Company.

At the master control panel the operator has before him three remote dial scale indicators so that he can see the progress of the cumulative weighing at each of the three hopper scales. He also has 30 weight selecting verniers whereby he can select the ingredients which his formula calls for and the number of pounds of each. Indicating lights show a full supply of material, the feeders which are selected and the particular feeder which is running as the scale in question accumulates its weight.

Also on this panel are the timers which determine the length of mixing time for both mixes so that batches are delivered alternately to one mixer and then to the other, continuously so long as that formula is being run.

A batch stop-counter permits the operator to establish the number of 3-ton batches which his order called for after which the system will shut down so that a new formula can be established.

Interlocks are provided which will prevent a feeder from running unless there is a full batch supply ahead of it; will prevent a new batch being started unless the scale dial returns to zero indicating a complete discharge of the previous batch; will stop the system automatically if the operator fails to set his weight verniers on a cumulative basis; and will stop the entire system if any motor overload kicks out. These interlocks are tied in with bulls-eye lights so that the operator will be advised immediately of any faulty condition.

"CHARTS"

Quick Solutions for Everyday Problems...

Specifically designed by SOUTHERN POWER AND INDUSTRY to serve the needs of Southern engineers, operating officials, department heads and maintenance foremen, "CHARTS" gives quick solutions for everyday problems. And now you can get a three-year subscription to S.P.I. PLUS a copy of "CHARTS" for only $4.00.

Note the wide range of subject matter:

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"CHARTS" is not for sale separately, but if you have been intending to subscribe to SOUTHERN POWER AND INDUSTRY—or if your present subscription is about to lapse —write today using the coupon at right and take advantage of this outstanding offer.

Our Supply is Limited So You Must Act Quickly!

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Enclosed is $4.00.

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Mailing Address _____
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Company _____ Position _____
Products Manufactured or Nature of Business _____

Possible solution for the average plant or office . .

Maintaining Catalog Files

By DON V. PURINGTON, Houston, Texas

IT IS NOT conceivable that the baffling confusion of names for mechanical devices will be cleared in our lifetimes, and the problem of filing and finding catalogs will be with us always.

We will always be confused by the conglomeration of names for steam generating units and boilers, or other primary equipment and can expect to have a private argument with ourselves as to whether we should classify the file as Heating Units, Boilers, Steam Generating Units, Thermidons, or what have you.

About the only possible solution for the average plant or office, which cannot justify an elaborate library system and librarian, is an arbitrary classification as near to reason as the material will permit.

Three Classifications

In our office we maintain three sets of catalog files for the brochures and pamphlet type catalogs. These are identified by a prefix letter "A" for Architectural and Structural, "E" for Electrical and "M" for Mechanical. If desired, these can be divided further by an additional letter prefix such as "EP"—Electric Power, "EL"—Electric Lighting, and "EC"—Electric Communications or Controls.

File Divisions

Under these sections, we can start off in the mechanical section with Abrasives, Abrasive Treatment, Acid Resistant Materials, etc., through to Water Treatment, Welding and Wrought Iron. These will be the general file division headings and should be selected to fit the particular office practice for such classifications. Each of these general file divisions can be assigned a number from one (1) to infinity.

With the assistance of some of the indexes in engineering and architectural handbooks, or those prepared by Associations like the A.I.A. (none of these may exactly fit the particular office practice) the catalogs to be filed are separated according to the general file divisions.

In numbering these divisions, it is advisable to skip a number at intervals, to allow for additional divisions which may become necessary at a later date. The manufacturers do produce new products which were not conceived at the time of this first division.

When this general division has been accomplished, it may be desirable to provide secondary divisions, such as the division of the Conveyors into the various types, overhead, screw, belt, etc. These secondary divisions are identified by the first decimal number such as M-1.1, M-1.2, etc. The catalogs can be sorted into stacks according to the divisions established.

Procedure

After the catalogs are divided according to the chosen divisions, each division is then arranged in alphabetical order. The trade name of the equipment, or the name of the manufacturer may be used. We use the trade name, but include the manufacturer's name on the file index tab.

Since there are twenty-six letters in the alphabet, the file folders are given the appropriate number corresponding to the number of the proper letter in the alphabet.

Thus: Catalogs under Section 1, Abrasives, beginning with "A," such as "Alpha Abrasive Aggregates" would be filed in a folder numbered M-1.0010 and on up to M-1.0260 for products beginning with the letter "Z."

If there is a second or third product beginning with "A," such as "Apex," the folder will be numbered, M-1.0011, etc. Should there be more than nine such products the tenth folder would be numbered M-1.00110, the eleventh, M-1.00111, etc.

If there is a secondary division, one for Aggregates and another for Abrasive Machines, the folders in the secondary division will be numbered M-1.1010, etc.

The file folders are numbered for the corresponding alphabet numbers in all cases, and if there are no products beginning with "B" or "C," the numbers M-1.0020 and M-1.0030 are omitted, until product catalogs to fill these folders are secured. In this manner, the alphabetical sequence of each division can be maintained indefinitely for future additions.

The file folder tabs may contain whatever information is desired, as follows:

ABRASIVE AGGREGATES
M-1.0010
ALPHA
Contex Mfg. Co., Purdon, Pa.

ABRASIVE MACHINES
M-1.1010
ALPHA
Contex Mfg. Co., Purdon, Pa.

The secret of effective operation of any catalog filing system depends on returning the catalog to its proper place in the files. This requires that each catalog, pamphlet, letter, or brochure be numbered with the number of its proper file folder. One clerk or stenographer familiar with the system can prepare the folders, number the material to be filed, and keep the files in proper order without difficulty.

The large catalog binders and books are kept on shelves in alphabetical order.

here's how high temperature piping can flex its muscles

Each pipe hanger is scale tested to rigid tolerances by a skilled workman at the Navco plant. After final assembly and inspection, the hangers are carefully crated and readied for shipment.

NAVCO *Counterpoise* Pipe Hangers

Since high temperature piping has no respect for equipment connections, the entire piping system must flex its muscles to absorb the strain of expansion and contraction. This prevents serious stresses that could endanger the installation.

And how does high temperature piping flex its muscles? With Navco's precision engineered Counterpoise Pipe Hanger—the hanger with a load-supporting effort that is of constant value throughout the range of travel. This permits weightless movement of the entire piping system.

To learn how power plants, oil refineries and chemical plants can have piping systems that flex their muscles, write today for Navco's 12-page Counterpoise hanger bulletin #153.

NAVCO

NATIONAL VALVE & MANUFACTURING COMPANY

3106 LIBERTY AVENUE, PITTSBURGH 1, PENNSYLVANIA

New York • Chicago • Cleveland • Boston • Atlanta • Buffalo • Cincinnati

HELPING the *MAN-IN-THE-PLANT*

Ideas . . Methods . . Gadgets

Water Saves Oil And Elbow Grease

EVERY experienced millwright has run up against the problem of backing off nuts from thoroughly rusted bolt threads. The thread fit may have been excellent when the nuts were tightened up, but the chances are that oil was not applied during the original threading job.

Very few mechanics stop to think of the considerable pressures that are set up between the surfaces of two threads. Common sense and a little trial and error program should convince these skeptics, but the practice of forcing dry threads together goes merrily on.

After some years of undisturbed rusting it becomes necessary to dismantle such a set-up, and the job will often be found difficult or impossible unless special means are taken to counteract the difficulties encountered. If brute force is used alone, the result is likely to be galled and ruined threads, or the bolts may twist off before the rust grip will let go. Even though the thread starts to loosen, this is no guarantee that it will not start to gall again after a few more pulls with the wrench. Once that starts, all hope of a decent job is gone.

Rust Solvent

Consequently, the careful mechanic is apt to douse his rusty job freely with penetrating oil. This is excellent but for big pieces penetrating oil is expensive and not easy to apply. There is a liquid, however, that is common, cheap, and accessible, that believe it or not, is even better than oil.

The very moisture that is so conducive to the formation of rust is actually its best solvent. A fair trial should convince the most skeptical. Soak your rusty threads in plain water somewhat in advance of the time you want to loosen the nuts and the result will surprise you. In some locations this is, of course, hard to do. When the nuts are, for instance, on the bottom surface of the machine, some well soaked rags or waste laid on the threads for a few minutes may prove ample. In any case the more thorough the job of soaking, the better the results are apt to be.

Don't make the mistake of thinking the wetting will produce

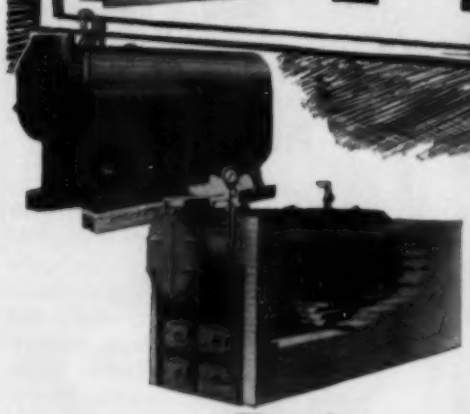
Modified Hand Lift Truck Handles Cylinders

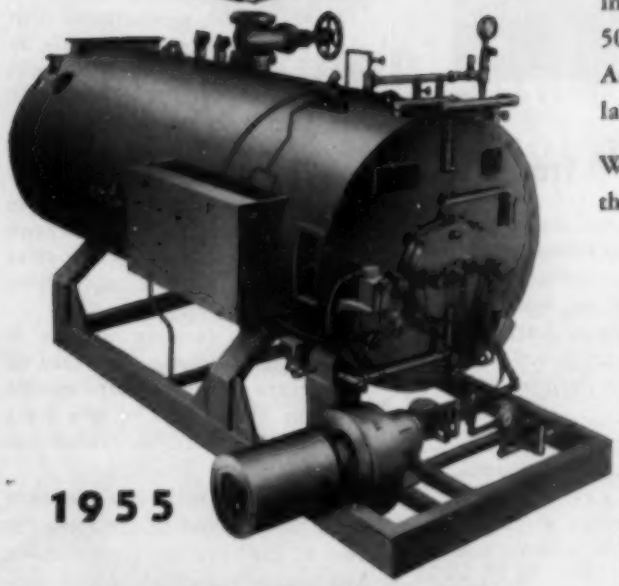
HANDLING cylinders 30 in. in diameter, 82 in. long and weighing more than a ton and a half each formerly presented some real problems for the Moreland Chemical Company of Spartanburg, South Carolina. Now, thanks to a modified Yale & Towne hand lift pallet truck, these cylinders can be handled easily and rapidly by one man.

Key to this operation is special forks on the hand lift pallet truck. These forks are 72 in. long, 9 in. wide and formed in an inverted "V" which serves to cradle the cylinder when the forks are raised. To pick up the load, the truck is maneuvered so that the forks straddle the cylinder. Multi-stroke hydraulic lift raises the forks 4 in. cradling the cylinder and lifting it off from the floor for transit.

Successful use of this truck at the Moreland Chemical Company suggests that this hand truck modification offers an excellent method of transporting heavy cylindrical objects such as drums and rolls of paper.

107 YEARS of RELIABILITY ARE BEHIND EVERY AMESTEAM GENERATOR





AMESTEAM GENERATOR

20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas, or oil-gas combinations with quick fuel switchover feature.

In your selection of a boiler, it's important to remember — experience *does* count. And what better assurance of top boiler quality do you have than the Ames record: 107 years of building fine boilers — boilers which have given economical, satisfactory service throughout the industry! Many Ames units purchased 40 to 50 years ago are still faithfully on the job. Amesteam Generators always incorporate the latest advances in package boiler design.

Write today for details on these boilers with the proven record of reliability.

AMES IRON WORKS, INC.
Box I-25, Oswego, N. Y.

Show me how I can benefit from Ames experience and nation-wide organization in getting a top boiler value.

NAME .....

ADDRESS .....

COMPANY .....

good results if allowed to dry out before using the wrench. The water treatment does not last as long as the job done with penetrating oil, but it is cheap and in most cases much handier.

Case Studies

One furnace repair man whom I know used water from a private bottle and had fine luck while his mates wondered what the old man's "magic formula" was. The old timer never told them until one day someone caught him refilling his bottle at the water tap and the secret was out.

The second case I have in mind involved a gasoline engine driven crane—a war surplus baby. A foreman took one look at what seemed like a carload of totally useless junk and passed it on to the next fellow as quickly as possible. Finally it came to the attention of the yard manager.

Among the parts were four outrigger jacks with 3 in. x 24 in. U. S. coarse thread which had laid out in the weather without any oil or protection for ten years. The nuts were on the bolts at about the center of the thread and the job certainly looked hopeless. If the dry threads had been forced, either the bolts would have been destroyed, or more likely, the wrenches would break.

So, one night at quitting time the bolts were lashed together and let down into the plant water intake canal and left to soak all night. Next morning all came loose with a single jerk. The nuts were then run the full length of the threads and dunked back into the river to wash off the loose rust. They were then dried and properly oiled. It proved to be an economical job.

By H. M. Bartwell, Ark.

Versatile Pump and Motor Moving "A Frame"

IN MOST refineries or chemical plants, pumps and motors are installed in crowded conditions. Some installations are in localities that prevent use of winch trucks or similar lifting devices because of these conditions or because of the danger of the ignition source that these lifting devices present. Large "A Frames" of a size normally used in most plants are not of such a "portable" nature that manpower alone can handle them with any degree of ease.

To facilitate handling of such problems, a portable unit was designed which amounted to placing a monorail on wheels. Maneuverability was assured by making the unit a three wheeled affair, with the single wheel provided with bearings so that it could be turned and so guide the monorail section between and over the items to be moved.

The portable frame can normally be handled easily by two men. The simplicity of the unit makes fabrication, upkeep and storage very simple.

By W. E. ACKERMAN, General Contract Supervisor, Maintenance Department, Carbide and Carbon Chemicals Company, Texas City, Texas

Production Puzzle

A CLAY products plant in the Southwest was beset with spasmodic periods when the breakage or spoilage loss through the dryers would jump abnormally high without apparent reason and after a few frantic days, mysteriously return to permissible limits —still without any obvious reason.

Most of the products of this plant are formed on auger mills by extrusion, and the major opinion was that the forming dies through which the items are extruded were at fault, but there was no proof that such was the case.

Waste heat dryers were used in this plant, hot air being drawn from kilns that were cooling after the burning process, and blown through the drying tunnels.

After the forming process is completed, the items are loaded on dryer cars and these cars pushed into the "wet" ends of the dryer tunnels. Normally the tunnels are kept full.

When one or more cars are taken from the dry end of a tunnel, the rest of the cars are pushed down and one or more cars of wet ware are pushed into place.

Under these conditions there is a lag of a few days between the time when any car of ware is formed and the time it is drawn

PERFORMANCE

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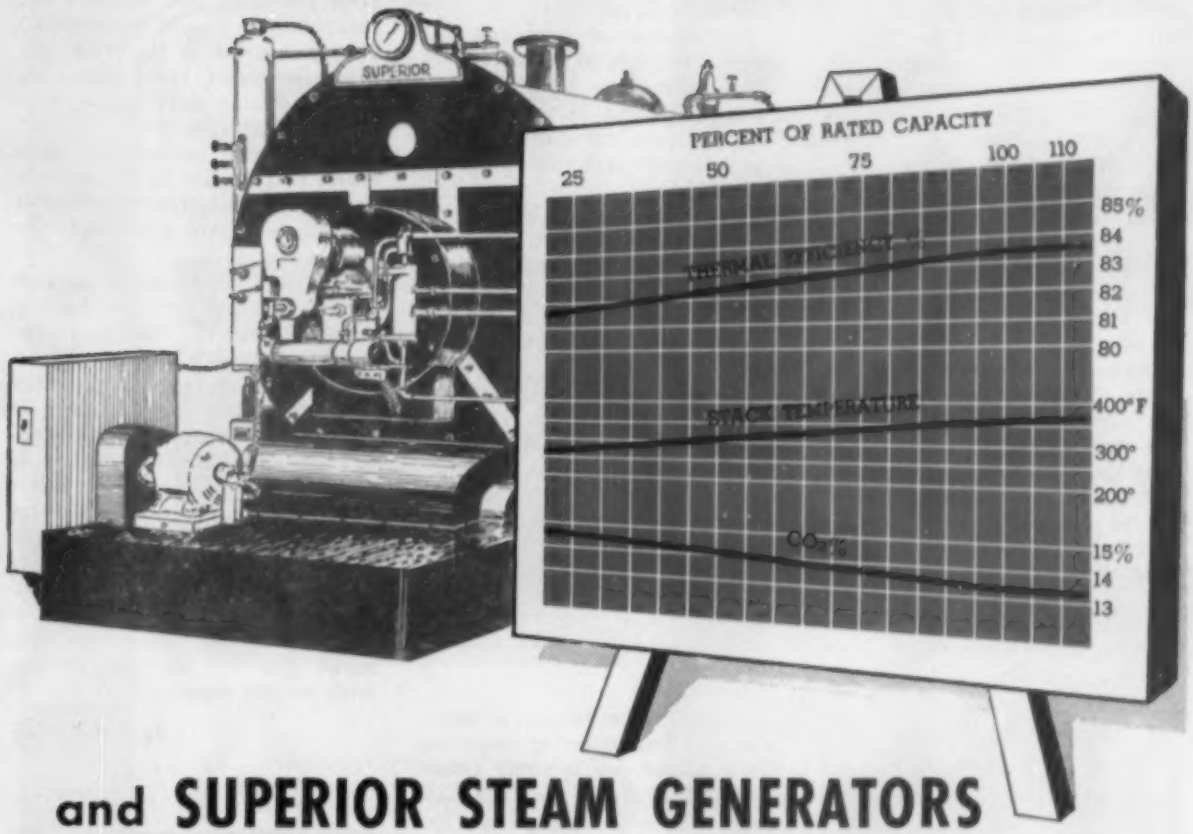

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from the dry end of the tunnel and set in a kiln.

Full data was needed for a thorough investigation, so each dryer car was supplied with a hook which carried a card stating the number of pieces on the car, the date made, and the pattern. Each die was numbered, and the die number placed on the same card.

The result was confusing. Ware made through a certain die varied in breakage from day to day. Also, ware made through the same die on the same day might have very little breakage from some tunnels and higher breakage from other tunnels.

We could not see how a cast iron die could possibly make good ware one day, bad ware the next day, and then return to making good ware again the third day.

The next step was to also register the number of the tunnel from which the car was drawn on the card.

The same cards stayed on the cars until the ware was set in the kilns and there the setters, also, recorded the number of broken pieces on each car.

The number of good and bad pieces were totalled at the end of each day and the dryer breakage loss was figured in percent. We then plotted a curve of the dryer loss each day—and this curve was revealing.

By taking the peak breakage dates on the curve and comparing them with the dates on the cards, it became apparent that the pieces which were made on Monday, or after a holiday, showed high breakage.

The plant on the whole did not operate on Sundays, but the hot air fan feeding the driers ran continuously. It was found that there was an entirely different air condition in the wet end of the dryers on Monday morning. And in exploring the idea farther we found that the cars of ware placed in the dryers during the first day or two after a shut-down of the manufacturing operation were subjected to an atmosphere much too dry and hot. The severe drying strains cracked the ware.

Since the loss was less on ware made the latter part of the week, this condition should be simulated during the rest of the week. To bring this about, the drying cycle should coincide more nearly with the manufacturing cycle.

Accordingly, instructions were issued that the hot air fan be shut down when manufacturing ceased and started again after manufacturing began.

This was tried, and conditions improved decidedly. A leading manufacturer of humidity controlled dryers was engaged to make tests. Eventually, a dryer with satisfactory humidity controls was designed, purchased, and installed.

With the air condition and temperature in each zone under automatic control, this machine cut the time for drying to approximately one fourth that of the old dryer. A dryer breakage loss was brought down to as low as two percent—rarely over five percent—as compared to as high as thirty percent with the old dryers.

By P. A. EARLE

Low Cost Tumbler Polishes Small Parts

A TUMBLER made in the machine shop at Gastonia Combed Yarn Corp., Gastonia, N. C., saves considerable time and expense in polishing small metal parts.

In one instance the cost of manually polishing spinning rings was about $52.00 per spinning frame. The cost of using the shop-made tumbler to do the same job was less than $5.00. There were 65 frames to service, thereby permitting a saving of more than $3000.00 to polish the rings on all of the frames just once.

The inexpensive tumbler was made from a 30-gallon wood barrel with a trap door cut in one side. The barrel was mounted on a simple rectangular chassis made of angle iron. A double reduction pulley is driven by a 1/3 hp electric motor operating at 1725 rpm. The barrel tumbler turns at 20 rpm, which proved to be the optimum speed.

The procedure for polishing is to clean the parts with an Oakite compound before placing them in the tumbler barrel. Small pieces of old leather and cotton felt in the barrel serve as the polishing agents for the rings which are tumbled for 24 hours. After tumbling, the rings appear like new.

$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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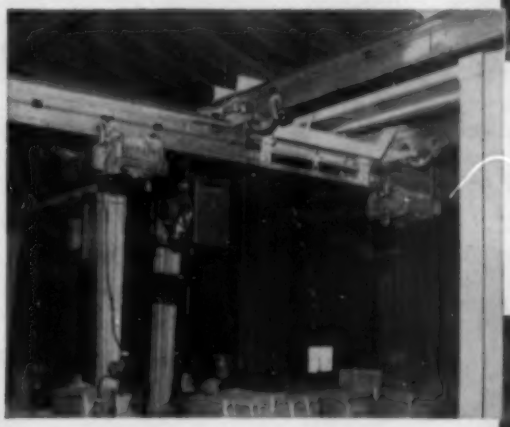
.....AMERICAN MONORAIL CRANES

for smooth operation at low maintenance cost use....

Three-ton hoist hook service extends from craneway to craneway by finger-tip controlled passage of carrier across crossover with cranes interlocked at each end.



One-ton hoist operated from crane bridge to crane bridge interlocked at crossover between craneways.

Three MonoRail cranes are interlocked to form passageway for transfer from receiving dock to steel storage area. Crane in foreground interlocks with spur track to each shear.

To handle variable loads over maximum areas, MonoRail Cranes offer smooth travel, easy movement, interlocking service between and beyond craneways, low initial cost and most important low maintenance cost. American MonoRail engineers are experienced in all phases of "up and over" handling. They are available for free consultation at your convenience.

Write for C-1 Bulletin

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

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Brick Handling

THE ACQUISITION of two Hyster lift trucks has made it possible for the Mike-Baker Brick Company of Lafayette, Louisiana, to save 24 man-hours per day.

The Louisiana plant operates one YT-40, 4000 lb lift truck, equipped with a side-shift carriage to allow perfect positioning of the Bickerstaff fork, and a counterweighted QN-20, 2000 lb capacity, also equipped with a Bickerstaff fork. However, because of its maneuverability the "20" does not require a side-shift attachment.

After extrusion from the brick machine all new bricks are stacked 489 per hack, in a standard pattern for proper handling with the special forks. From the stacking area the bricks are taken to the drying shed by the "20" at a rate of 50,000 per day—or 102 round trips each day over unpaved floors and uneven surfaces for a distance varying from 50 to 300 ft. The runways within the sheds are concrete.

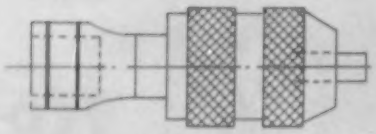
The Hyster "40" is used primarily to haul hacks of brick from the drying sheds to the kilns for hand setting. When the trucks are not performing their specific duties they are kept busy on miscellaneous handling jobs around the plant.

In addition to the resultant saving in time, the new handling system effects better utilization of space and less breakage.

PNEUMATIC tires on the Hyster "20" make the truck a natural on this type of operation. Truck makes approximately 102 round trips each day over unpaved floors and uneven surfaces.

Driving Taps and Reamers

A MANUALLY operated T-handle tap and reamer holder has been altered so it can be driven by an electric or air drill. The T-handle was cut off and a socket brazed on



in its place. The tap or reamer can be inserted in the "chuck-end" while the socket-end will receive either mechanical or manual drivers as well as extension arms for reaching hard-to-get places.

The modified tool can be extended to reach places previously difficult or impossible to reach. It can also be used with air or electric drills, allowing work to be done more easily.

By JESSE G. SMITH, Toolroom, Machinist Department, Baytown Refinery, Humble Oil & Refining Company, Baytown, Texas.

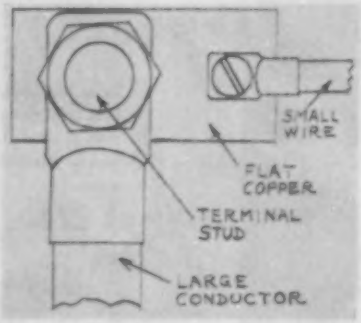
Motors Give Savings

A NUMBER of Sterling Slo-Speed Motors are used throughout the plant of De Soto Hardwood Flooring Company in Memphis, Tennessee. These motors are compact, rugged, streamlined, and have protected end bills. They are doing an outstanding job.

One unique application of these motors is their use on two lumber transfers. Lumber is unloaded from the railroad and truck dock to the transfer car where it can be distributed to operators according to size and use. The Slo-Speed Motor drives the transfer car through chain and sprocket along a 250 ft track for distribution. Electric power is supplied through an overhead cable which carries looped conduit wire that is reeled in or out as the car moves along.

The most recent labor saving use of Slo-Speed Motors is in connection with a Frick edge bonder. Furniture lumber comes from the glue machine to the table and is fed to the bonder. The table feeding the edge bonder was constructed locally and a Sterling Slo-Speed Motor is used to feed the furniture dimension.

This process was formerly done by hand and installation of the new motor resulted in increasing production over 20% as well as improving morale of employees and reducing rejects. Sequence of operations can now be closely synchronized from glue machine to edge bonder.



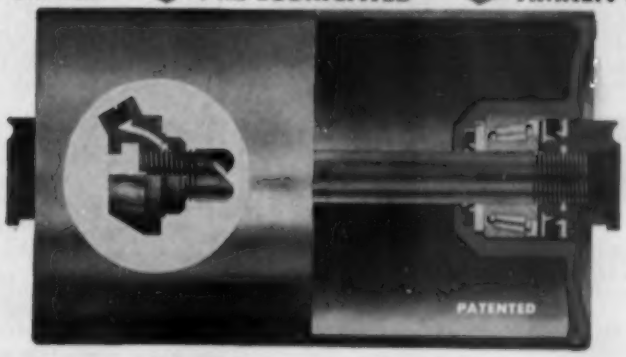
Wire Terminal

WHERE it is necessary to connect a relatively small size conductor wire to a large terminal stud, a simple arrangement may be employed as shown. A short length of flat copper bus bar or similar material is drilled and tapped at one end to accommodate a screw type connection for the small wire, and it is drilled at the other end to slip over the large terminal stud.

By THOMAS TRAIL

You Need... CONTINENTAL'S UST Idlers

UNIT-SEALED PRE-LUBRICATED TIMKEN BEARINGS



Saves Grease!
Saves Labor!
Saves Belts!
Long Life - THE ULTIMATE IN MINIMUM MAINTENANCE

Continental's Unit-Sealed "UST" Conveyor Idlers, incorporating Timken Bearings, Garlock Klosures, are the answer to the operator's prayer.

The Unit Bearing Assemblies—"sealed unto themselves" provide an ample but not excessive grease reservoir. This represents a saving of grease and further eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The lubricant is a top quality water repellant grease of a stable consistency with a wide temperature range for long life.

Most important—this construction permits operating the Continental "UST" Idler for extended periods of time without relubrication for 1-2-3 years or longer depending upon the severity or character of conditions.

For detailed information on these idlers write for Bulletin S.I.-116

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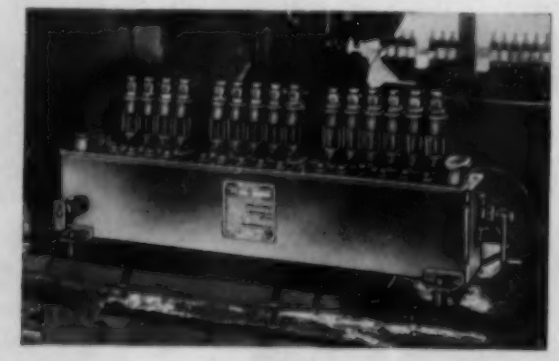

Because they operate automatically—dependably lubricating vital parts without thought or attention whenever machinery is running—Manzel Force Feed Lubricators eliminate costly shut downs for hand oiling and for repairs necessitated by faulty or neglected lubrication. They save labor and lubricants, too.

To keep costs down and production up, keep machines running with Manzel Force Feed Lubricators. They can be installed on machinery you are now using or incorporated into new equipment. For information write:

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DIVISION OF FRONTIER INDUSTRIES, Inc.
318 BABCOCK STREET, BUFFALO 10, NEW YORK

Chemical Cleaning

Salt Water System in a chemical plant—Deposits up to 4" thick were retarding flow through 13,000 ft of salt water mains ranging from 10" to 14" in diameter. These mains, in a Gulf Coast chemical plant, required 60,000 gallons of chemical solvents to fill them. The solvent was allowed to soak for 8 hours then flushed with salt water before returning the system to service.

Before cleaning, the lines showed pressure drops from the pump stations to consuming points of up to 68 psig. After Dowell Service, pressure drops were comparable to those expected with new pipe.

Sewer System in a refinery—A 20" refinery sewer system was encrusted with deposits ranging from 6" to 14" in thickness, which the plant crew had been attempting to remove mechanically for three weeks. When Dowell was called to clean this line with chemicals, only seven days remained before the plant was scheduled to be put back on stream. Dowell Service cleaned the system with chemicals in only six days, removing approximately 370 cu ft of scale. After cleaning, the sewer was again able to handle its designed capacity of 1.3 million gallons per day.

Gas Line in a petrochemical unit—About 80 miles of 4" gas line supplying a petrochemical plant was fouled with rust and iron sulfide. After chemical cleaning by Dowell Service, tests showed the gas capacity of the line had been increased 46.2%, with only a minor interruption in plant operations.

Fresh Water Lines in an oil refinery—An 11,000 ft section of water line ranging from 10" to 16" in diameter, was encrusted with iron tuberculations, silt and sludge. Parts of the lines were buried, a portion ran under a bayou, the balance above ground. The estimated replacement cost of

the lines, in lieu of chemical cleaning, was approximately $100,000. Dowell Service cleaned the lines in place by pumping liquid solvents into the system through existing connections. The system was restored to service in only 38 hours.

Airless Blast Cleaning

REDUCING cleaning room labor requirements 150 man hours weekly is only a small part (even though the savings effected are sufficient to return the entire investment in less than a year's time) of the overall cleaning performance of one airless blast cleaning machine at Jakes Foundry Co., Nashville, Tennessee. More important is its versatility in solving a number of cleaning problems.

In addition to wheels and other parts used on industrial trucks and trailers this firm manufactures, the foundry produces large municipal and construction castings for outside sale. These castings range in weight from 1 to 1000 lb. A table-type airless blasting machine manufactured by American Wheelabrator & Equipment Corp. handles them all. It replaced two large tumbling mills and made it possible to relocate the cleaning room at this company, affording the owners some valuable and badly needed floor space.

The machine serves the welding, structural steel, machine, paint, and

OVERALL view of the 66" Wheelabrator Swing Table. Dustube dust collector for keeping the work areas clean and dust free can also be seen.

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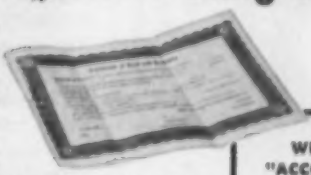

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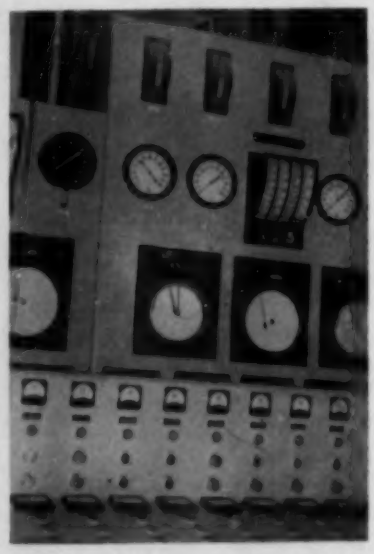
rubber shops, doing such varied jobs as removing rust, scale, welding flux, and preparing the surfaces of wheels to receive molded-on rubber tires. In these operations, it has replaced mechanical chipping, wire brushing, chemical cleaning, and surface grinding.

It is a conservative estimate that the total cleaning problem previously required 220 man hours weekly. With the airless blasting machine, more and better cleaning is being done with less than 1/3 the man power.

Central Control of Five Boilers

BETTER production of steam with less help is the result of centralized controls which enable the fireman to control five boilers from one station. The only moving about required is that necessary to take readings for the log and the lighting of or shutting off burners.

The controls at the Pasco Packing Co. in Dade City, Florida, consist of push buttons, position indicators, and selector switches. The dampers for the forced draft and induced draft fans as well as the oil valves are all controlled by



PARTIAL view of control panels with large panel in background.

Hays combustion controls which normally operate automatically but at times must be operated manually.

The selector switches allow a fireman to choose either automatic or manual operation. The push buttons allow manual operation of the forced and induced draft dampers. The position indicators show the degree of opening or closing of those dampers when the dampers are remotely located.

The centrally located panel has a slanted top with a vertical back. On the vertical back are mounted the start and stop buttons and indicating lights which control all motors essential to boiler operation.

Four boilers have steam flow meters, Hays combustion meters, temperature recorders, draft gages, water level indicators and oil pressure gage mounted on a panel 15 ft long and 9 ft high. The meters and controls for the fifth boiler are remotely located. All five boilers are controlled by one fireman from the central panel 7 ft long located in front of the large panel.

The small control panel is low enough so that draft gages, flow meters, and combustion meters are not hidden from the fireman's view. By standing in front of the small desk type panel the fireman can at a glance see any draft gage or meter and keep a constant check on the overall picture of boiler operation. Any failure of the automatic controls is immediately spotted and corrections are made.

Smoke indicators are used and are of the visual, mirror type. These indicators are all located so that the fireman can see stack conditions from his position at the central control panel.

Located below the slant top of this control are a number of shelves which serve as a convenient storage space for charts to be used on flow meters, combustion meters and temperature recorders.

By A. T. LOHKAMP, Plant Engineer, Pasco Packing Co., Dade City, Florida

$$$ For Your Ideas

See Page 90

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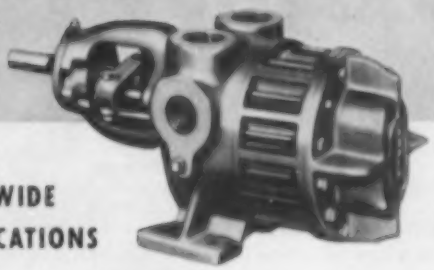
ROTARY PUMPS

for Positive Results



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K	Pressure Lubrication Hydraulic Service Industrial Oil Burner Fuel Supply	to 150 P.S.I.	½-50 G.P.M.
H	Hydraulic Power Test Equipment Pressure Lubrication High Pressure Coolant	to 1000 P.S.I.	5-75 G.P.M.

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Avon Park Station

This type of Warren-Quimby Screw Pump has long been in successful service in the handling of fuel oils, lube oils and various other lubricating liquids. It is essentially a pump for high pressure applications and is available in three general types of construction:

1. Anti-friction bearing design
2. Anti-friction bearings with fixed center bearing
3. Sleeve bearing design

Also, a Long Body Gear-In-Head Pump is built for high pressures when handling light hydraulic oil and other applications for pressures up to 1000 P.S.I., and for very low viscosity liquids, such as No. 1 and No. 2 fuel oils at pressures up to 500 P.S.I.

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PQ-4

WARREN STEAM PUMP COMPANY, INC.
Warren, Massachusetts

New Equipment

For more data circle item code number on the postage free post card — p. 17

Floor Paint Container for Large Area Work

B-1 The American Products Co., 3308 Edson Ave., New York 69, N. Y., has introduced a floor model paint container called the "Rol-A-Pot," with heavy bar aluminum runners which allow it to slide easily on the floor without danger of tipping.

An important feature is the non-slip roller-ramp which is so designed as to deposit the right amount of paint, evenly distributed, on the paint roller. It provides excellent traction to rotate the roller when loaded with paint.

Rustproof heavy gauge galvanized steel and reinforced leakproof corners insure th long life of the "Rol-A-Pot."

The container is of rectangular shape (14 in. x 21 in. x 6 in. high), and holds up to 5 gallons of paint. It may be used with 14 in. and 18 in. rollers. Also available are "Rol-A-Pot" containers of 1 gallon capacity for use with 7 in. and 9 in. rollers.

Universal Hand Truck

B-2 Lewis - Shepard Products, Inc., Watertown, Mass., has announced a new Universal Hand Truck for both barrels and drums. The unusual feature of the truck is the pivoted mounting which permits the operator to pick up and "break over" a drum without lifting either truck or drum off the floor.

The operator pushes the truck up against the drum and engages the adjustable hook on the top lip of the drum. He then steps on the foot pedal which allows the wheels to become "free-wheeling" and to move in a backward direction away from the drum. As the drum is "broken over," the prongs slide under the drum and the truck and drum pivot until the drum is in the carrying position.

The weight of the drum is eliminated from the effort required to break over the truck. When the truck is raised to the vertical position, wheels automatically lock in the forward position. When not in use, the truck stands in the vertical position.

The hand truck can handle drums or barrels 20" to 36" in diameter weighing up to 600 lb. The truck is 23" wide and weighs 65 lb.

Tractor-Shovel for Bulk Material Handling Operations

B-3 THE FRANK G. HOUGH COMPANY, 878 7th St., Libertyville, Ill., are marketing their new "HA" model "Payloader" tractor-shovel which has twice as much lifting, digging and carrying capacity as its predecessor. Bucket has been increased 16 2/3%, giving a payload capacity of 18 cu ft and a struck-load capacity 14 cu ft. Productive capacity has been increased from 50 to 100% and maximum dumping height 18%. It can be operated into and out of boxcars with ease.

An entirely different bucket arm design permits exceptional breakout action of the bucket and 40 degrees of tipback. This new design makes it possible to carry heaped loads at a lower level, thus providing greater stability and better operator vision.

New standards of operator safety and ease of operation result from a combination of the new bucket arm design, which keeps the arms below the operator's level, and a hydraulic accumulator which minimizes load shocks and stabilizes the hydraulic controls.

Torque converter drive and full-reversing transmission are combined to assure fast operating cycles and ease of operation.

A sealed and pressurized hydraulic system has been incorporated and double-acting rams operate the boom-arms and the bucket. The ease of accessibility of all service points has been improved to assist better maintenance.

2" Portable Pipe Machine

B-4 THE OSTER MANUFACTURING CO. Cleveland, 3, Ohio, is marketing their No. 552 "Pipe Master" complete portable pipe and bolt threading machine which

DARTS are DROP-TIGHT and No Question About It!

HERE'S WHY — The "business part" of Dart Unions are two bronze seats, precision-ground to a true ball joint. They close easily for a drop-tight connection always — without fuss or strain. Because seats remain unscarred, Darts can be used over and over again in other locations. Each Dart is individually vacuum-tested, also. Just figure what you'll save — see your supplier.

QUICK FACTS

- LONGER LIFE through extra wide bronze seats that resist pitting and corrosion
- LONGER LIFE through heavy shoulders that can take severe wrenching
- LONGER LIFE through a nut and body which are practically indestructible. (They're made of air-refined, high test malleable iron.)

DART UNION COMPANY
Providence 5, Rhode Island
The Fairbanks Co., General Distributing Agents
Boston • New York • Pittsburgh • Rome, Ga.

DART UNIONS

CALL YOUR LOCAL DISTRIBUTOR FOR PROMPT DELIVERY OF DART UNIONS

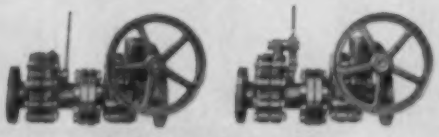
Combine them

any way you choose for your boiler blow-off

Straightway and Angle Duplex Units

Straightway and Y Duplex Units

Angle and Y Duplex Units


Straightway Duplex Units

More than a dozen different arrangements of valve designs and operating methods are available to you in the complete Everlasting line of boiler blow-off valves for operating pressures up to 600 psi. Here is a range of selection from which you can get exactly the combination you wish.

For half a century, Everlasting Valve designs have been proving their effectiveness, reliability and durability—the kind of service you need for boiler blow-off. Each design fully meets ASME Code requirements. WRITE FOR BULLETIN

For "everlasting" service, use

EVERLASTING *Valves*

EVERLASTING VALVE CO.
53 FISK STREET, JERSEY CITY 5, N. J.

EV304

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

will ream, thread and cut-off all sizes of pipe from ⅛" to 2" and will drive geared die-stocks and cutters up to 12", through a special drive shaft.

The new portable machine weighs only 265 lb. Spindle speeds are automatically variable with load—22 to 36.

Industrial Quick Couplings

B-5 THE BRECO DIVISION OF PERFECTING SERVICE COMPANY, 332 Atando Avenue, Charlotte 6, N. C., has announced a complete line of "Pushomatic" quick connect and disconnect hose couplings featuring one-hand operation without turning or twisting to lock. Couplings are automatically locked by pushing in, making a high pressure leakproof connection.

Applications include air, hydraulic, or fluid handling up to 10,000 psi. A new 1A Series was designed specifically for instrumentation, manifold and panel installation where space is limited. The 2A series is designed for pneumatic tools, air, water and hydraulic supply lines.

An integral check valve automatically shuts off line or hose pressure when disconnected, preventing danger of backlash or whipping. Complete line is described in the company's Bulletin 54-1 R.

High Speed Gear Unit

B-6 THE PHILADELPHIA GEAR WORKS, INC., Erie Ave. and G St., Philadelphia 34, Pa., has developed an improved line of Hi-Speed Gear Units for speed reduction and increaser service. These standardized units have been designed to operate above the speed range of ordinary reducers. Rotating speeds up to 9000 rpm and pitch line velocities to 10,000 fpm can be accommodated without modification.

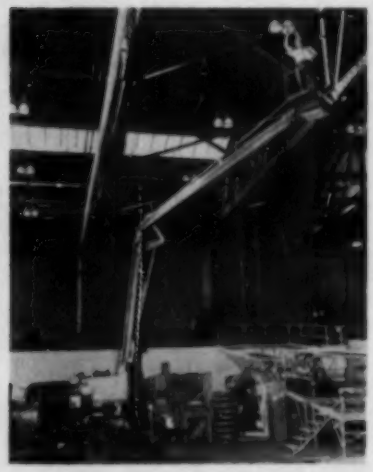
These Philadelphia Hi-Speed Gear Units are finding wide acceptance in service with turbine drives, test stand drives and air conditioning applications. These units are manufactured in 17 distinct sizes for ratings up to 7100 hp and are available in any specified ratio from 1:1 up to 10:1.

Gearing is of the double opposed helical type having teeth hobbed and

precision shaved. Opposed helices completely eliminate thrust forces against bearings and housing. Gearing is dynamically balanced to provide vibration-free power transmission at even the highest rotating speeds.

Aerial Platform

B-7 PITMAN MANUFACTURING COMPANY, 300 West 79th Terrace, Kansas City 14, Missouri, has introduced a hydraulically-operated aerial platform which is operated by its own independent power source. It can be easily installed on a truck in a matter of hours. Factory installation is not required.



With a two-section boom that can put a workman 40 ft into the air, the aerial platform—called Giraffe—can handle up to 450 lb at any radius with no outriggers or 1000 lb at any radius with outriggers. The boom can be rotated continuously in either direction and its two sections can be moved up or down independently or at the same time.

Insulation is provided to protect the upper end of the boom and platform against 7500 volts. Seamless steel tubing has been used almost exclusively in place of hose to carry hydraulic fluid. In case of a possible break in a hydraulic line there are restrictors in the system which lower the boom at a controlled rate of speed.

Platform design features foot-operated controls on the working platform. The same power source used for the aerial platform can be used to operate a compressor or generator, making possible use of the wide range of power tools available for overhead work.

Parkersburg Water Dept. reports

LATTICE BRAID*

outlasts previous pump packings

3½ to 1

Below:
Centrifugal pumps at Parkersburg, W. Va., Water Dept.

*Registered Trademark
Only Garlock makes LATTICE BRAID rod and shaft packings.

The Water Department of the City of Parkersburg (W. Va.) has found that LATTICE BRAID pump packing has many advantages. Using LATTICE BRAID asbestos packing on their water pumps, they can pump 140 to 150 million gallons of water before the packing needs to be replaced. In terms of service life, LATTICE BRAID lasts for 12 months—3½ times longer than any previous packing. In addition, according to Ray Daniels, chemist at the Parkersburg Water Dept., LATTICE BRAID Packing needs very little adjusting *and* causes *no* wear on sleeves!

Put Garlock LATTICE BRAID Packing to work for your company. All the braided strands of this unique packing are lattice linked together into one structural unit. The strands hold together even when the packing is worn far beyond the limits of wear of ordinary braided packings.

LATTICE BRAID is made from flax, cotton, asbestos, wire-inserted asbestos, Teflon, and asbestos with Teflon impregnation—for various types of services.

Get all the facts about LATTICE BRAID *Packings. Contact your Garlock representative or write for new folder AD-131.*

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland Denver • Detroit • Houston • Los Angeles • New Orleans • New York City • Palmyra (N. Y.) • Philadelphia Pittsburgh • Portland (Oregon) • Salt Lake City • San Francisco • St. Louis • Seattle • Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK LATTICE BRAID PACKING

Equipment . . Supplies . . Methods (Continued)

Overload Protection Devices for Machinery Drive

B-8 MORSE CHAIN COMPANY, 7601 Central Avenue, Detroit 10, Michigan has developed an improved line of machinery drive overload protection devices featuring new high-friction wear-proof friction disks and new adjusting nut locking arrangement.

The improved units called "Morse Torque Limiters" are slip-type friction clutch devices upon which such drive components as standard Type A plain plate roller chain sprockets, special V-belt pulleys or gears can be mounted. They act as automatic shear pin mechanism and avoid the time and labor required to insert new shear pins.

Model 445-1 of Morse Torque Limiters has a maximum torque capacity of 50-foot pounds. Typical spacers and bushings are shown.

The drive component is mounted on a metal bushing in the Torque Limiter unit and clamped between two friction disks by the action of an adjustable spring. When an overload is imposed on a machinery drive, the sprocket or related drive component breaks away from the clutch disks and slips at from one half to one third the torque setting until the motor is shut off and the overload condition is corrected. No resetting is needed to make the Torque Limiter operative after the overload is removed.

Conveyors, automated machine tools, materials handling equipment, packaging machinery and related types of machinery drives where overload protection is needed are ideal applications.

Chemical Pumps

B-9 BYRON JACKSON COMPANY, Pump Division, PO Box 2017, Terminal Annex, Los Angeles 54, California has announced a new addition to their line of chemical pumps. Four basic pump sizes for handling acids and other corrosive chemicals cover a capacity range from 20 to 400 gpm.

Design features include the following: The complete pump rotating element, bracket and stuffingbox assembly can be removed as a unit, without disturbing the suction or discharge piping; all parts are interchangeable, with the exception of the pump case

For more data circle item code number on the postage free post card—p. 17

Building problems can have
2 RIGHT ANSWERS

Most building problems can be solved efficiently by Armco Steel Buildings. They are of durable all-steel construction; are easily and economically erected; and need little maintenance.

Armco Series S Buildings may be used for tool sheds, offices, shops, warehouses, industrial garages and other structures requiring widths from 4 to 40 feet. Greater widths are available with multiple-span buildings. Unique STEELOX construction simplifies and speeds erection.

Armco Series P Buildings are used for large warehouses, factory buildings and commercial structures needing clear span widths from 30 to 100 feet. These buildings have a steel framework covered by corrugated metal sheets.

Both buildings may be extended or dismantled and re-erected without loss of material.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
DIXIE DIVISION
619 Forsyth Building — Atlanta, Georgia
SOUTHWESTERN DIVISION
C & I Life Building — Houston, Texas
Other Offices in Principal Cities

ARMCO
ARMCO STEEL BUILDINGS

Send me data on Armco Steel Buildings:
I'm interested in a building_____ feet wide by_____ feet long.

NAME_____

ADDRESS_____

and impeller—thus a small supply of spare parts can serve a large number of working pumps.

The chemical pumps are available in Alloy 20 for increase corrosion resistance and cast iron for general service. Performance charts, selection table, dimensions and specifications are included in the company's Bulletin No. 54-1-640.

400 Amp. Circuit Breaker

B-10 I-T-E Circuit Breaker Company, 19th and Hamilton, Philadelphia, Pa., announces a new 400 amp circuit breaker, designed to bridge the gap between the 225 amp frame molded case circuit breaker and the 600 amp model.

This compact unit—more than one-third smaller than the 600 amp-frame breaker—measures 9 in. wide, 15⅛ in. high, and 5½ in. deep. It is designed for use in panelboards, switchboards, motor controls, bus duct plugs, and individual enclosures.

Lightweight Generator

B-11 Master Vibrator Company, 1752 Stanley Avenue, Dayton, Ohio, has developed a lightweight generator to meet the need for temporary or emergency sources of power in industrial plants.

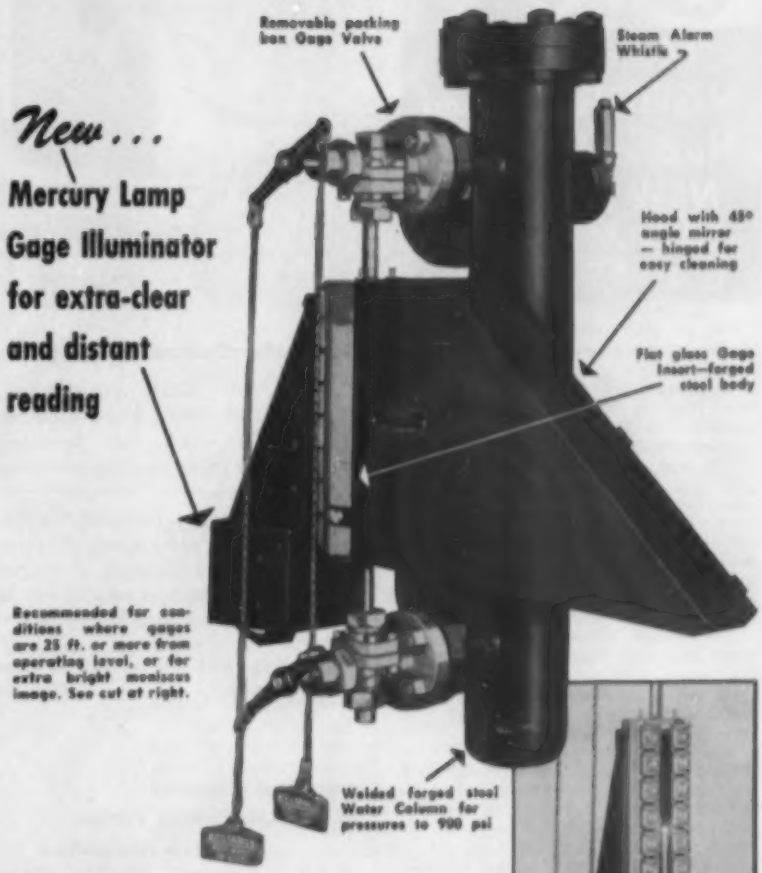
Generator, which can be carried by one man, puts out 1500 watts, enough to operate small tools, floodlights, electric pumps, etc.

A 4-cycle, direct-drive, 3-horsepower gasoline engine runs the generator. Because of its automatic rewind starter and two built-in sockets, you can plug in and have it running in seconds. The generator is available as the 97 lb d-c unit or 107 lb a-c unit.

Your principal source

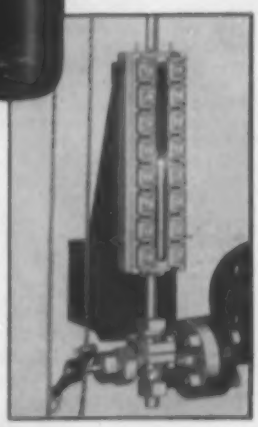
for modern Water Columns and Water Gage Equipment-

Reliance


Removable packing box Gage Valve
Steam Alarm Whistle
Hood with 45° angle mirror — hinged for easy cleaning
Flat glass Gage Insert—forged steel body
Welded forged steel Water Column for pressures to 900 psi

New . . . Mercury Lamp Gage Illuminator for extra-clear and distant reading

Recommended for conditions where gages are 25 ft. or more from operating level, or for extra bright monlscus image. See cut at right.



Reliance Water Columns for any working steam pressure assure you the utmost in dependability. High and low water level alarms are available on columns for pressures to 900 psi. Standard and special columns and complete safety gage equipment are made for pressures to 2500 psi.

The Reliance Gauge Column Company
5902 Carnegie Avenue Cleveland 3, Ohio

The name that introduced safety water columns . . . . in 1884

Reliance®
BOILER SAFETY DEVICES

More inches of VISIBILITY . . . and No Blind Spots with NEW Jerguson STEAM GAGES

Assembly No. 618

You get more inches of visibility within centers available . . . and no blind spots with the New Jerguson Steam Gages with the horizontal expansion loop. The special new compact valve, with a *horizontal* loop that keeps the strain off the gage assembly under varying conditions of expansion and contraction, gives you maximum gage room within the centers.

The special offset single piece gage chamber design with staggered glasses and covers gives you continous visibility of the water level *with no blind spots* between gage sections.

The gage can be turned at any angle, yet there are no stuffing boxes between gage and valves. The ingenius design of the assembly includes a bracket so the gage will always stay in vertical position. The OS&Y valves have renewable seats and are standard with quick closing stem for chain operation, as shown, or available with plain closing stems and chain wheels.

Made in three designs of single piece chamber: for one, two, or three section glass for any W.S.P. Any Jerguson standard gage may be supplied with stems and flanges for use with this expansion loop valve.

Write for full information on Jerguson New Steam Gages with Horizontal Expansion Loop Valves.

JERGUSON

Gages and Valves for the Observation of Liquids and Levels

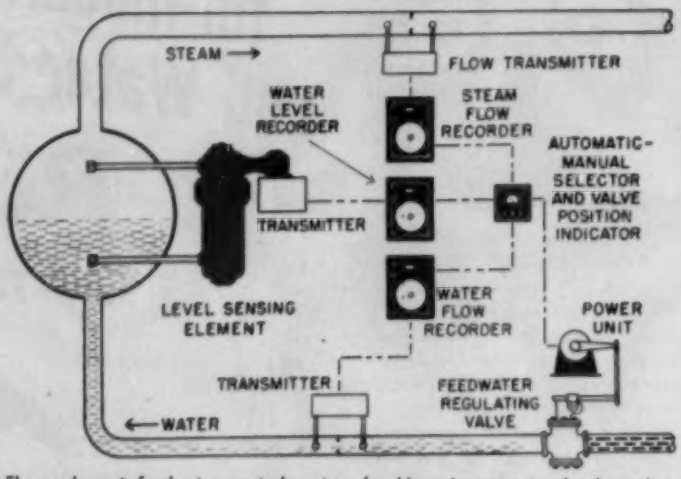
JERGUSON GAGE & VALVE COMPANY

100 Fellsway, Somerville 45, Mass.

Offices in Major Cities

Jerguson Trees Gage & Valve Co., Ltd., London, Eng.
Pétrole Service, Paris, France

Equipment . . Supplies . . Methods (Continued)



Three element feedwater control system by Hays incorporates level sensing, steam flow and water flow measurement.

Feedwater Control Systems

B-12 THE HAYS CORPORATION, 1942 Shirl Ave., Michigan City, Ind., has developed one, two and three element feedwater control systems.

The electronic operation of the controller provides great speed of transmission and high accuracy of control and is independent of effects due to normal variations in voltage and frequency.

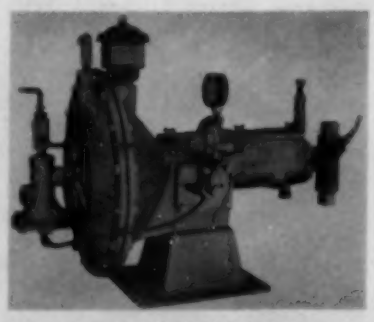
Three systems are offered to meet the requirements of large, medium or small boilers under normal or most severe operating conditions. Present instruments can be utilized and pressures up to 2500 psig can be accommodated.

Other desirable features are: positive valve drive (cannot freeze); operative even on cold boilers; mercury-less measuring and transmission for flow and level; direct level measurement; electronic null balance remote operation; independent adjustments for effects of steam flow, water flow and water level; no blow-down necessary.

Chemical Injectors and Proportioning Pumps

B-13 TEXSTEAM CORPORATION, PO Box 9127, Houston, Texas, is marketing positive displacement, reciprocating type pumps for chemical injection, proportioning, pressure lubrication and fluid transfer. Units are designed to handle all types of aqueous solutions and liquid lubricants and will inject or proportion additives into lines or vessels carrying as much as 30,000 psi pressure.

The company's type MSM Pump is illustrated. Other types include high volume transfer pumps, electrically operated high pressure and high volume injector and proportioning pumps, and high pressure injector pumps that are operated by rocker arms or reciprocating beams.



Texsteam Corporation's MSM Pump is operated by air or gas pressure and provides discharge ratios up to 497/1, which means that almost 25,000 psi discharge pressure may be obtained with only 50 psi operating pressure. This pump can be regulated to inject additives in exact proportions to the volumes carried in lines or vessels.

For more data circle item code number on the postage free post card — p. 17

Thermal Pipe Insulation

B-14 . MIRACLE ADHESIVES CORPORATION, 214 East 53rd Street, New York 22, N. Y. has developed a prefabricated, poly-vinyl chloride acetate pipe covering finish, designed to protect insulation against weather, abrasion, chemicals, mildew, etc.

The pipe covering finish, named "Protektinsul" is furnished to exact size, zips on and locks in place with its integral all poly-vinyl closure that insures a watertight and airtight longitudinal joint. The pipe covering finish requires no cutting, fitting, or sewing in the field, thereby effecting substantial time and labor savings.

Applied costs are reported to be less than present costs for eight ounce canvas. The result in savings should be approximately twenty cents per square foot, which is the cost of the usual three coats of paint which are not required when "Protektinsul" is used over pipes and ducts.

Photos show the application of two inch wide vinyl tape over insulated fittings; how "Protektinsul" zips on over installation; and the sealing of all joints and laps with a vinyl sealer.

FAIRBANKS

UNION BONNET GATE VALVES

125 lb.

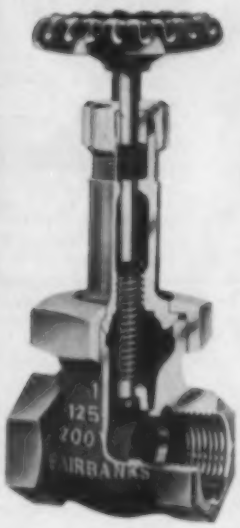


FIGURE U-0252 Rising Stem. Solid Wedge. Taper Seat. 125 Pounds Steam Working Pressure. 200 Pounds Cold Water, Oil or Gas Pressure. Non-Shock.

150 lb.

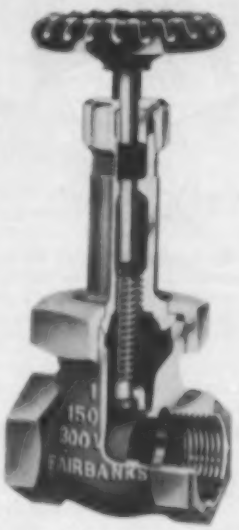


FIGURE U-0226 Rising Stem. Solid Wedge. Taper Seat. 150 Pounds Steam Working Pressure. 300 Pounds Cold Water, Oil or Gas Pressure. Non-Shock.

Two-Piece Union Bonnet Construction For Extra Easy Assembly And Disassembly

Two-piece **Radial Seat** Union Bonnet Construction provides extra easy assembly, long service, dependability that gives you extra value. **Radial Seat** provides line contact through accurately machined true ball and socket mating surfaces, for leakproof body bonnet joint. Two-piece construction eliminates sliding or scraping — prevents scoring — of body and bonnet mating surfaces during assembly and insures even contact pressure for perfect alignment of working parts. Heavy union nut will not deform under pressure and protects body and bonnet from distortion. Valves may be repacked under pressure when wide open—top seat above threads—out of line of flow—is protected against deposits and excessive wear.

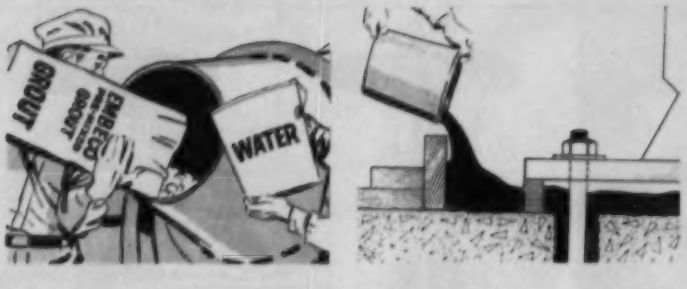
SERVICE: Recommended for general service on steam, water, gas, and oil lines where full, unrestricted flow is desired. Valves give long trouble-free operation.

YOURS ON REQUEST: Colorful, illustrated brochure fully describes Fairbanks Bronze Gate Valves with Union Bonnet Construction, complete with specifications and details. Write for your free copy today.

Order Fairbanks products through your local distributor who is always happy to serve you.

THE **Fairbanks** COMPANY
393 LAFAYETTE STREET, NEW YORK 3, NEW YORK
BRANCHES: NEW YORK 3 • BOSTON 10
PITTSBURGH 22 • ROME, GEORGIA
Trucks • Valves • Casters • Wheels • Dart & "Pic" Unions

Equipment . . Supplies . . Methods (Continued)



Ready-to-use Embeco Pre-Mixed Grout is being added as it comes from the container directly to the mixer. Only water is needed to produce a flowable grouting mix that is easily placed. The sketch at the right shows the grout being placed beneath machinery bedplate. The grout does not shrink upon hardening thus assuring maximum contact with the bedplate.

Pre-Mixed Grout and Mortar

B-15 THE MASTER BUILDERS CO. 7016 Euclid Avenue, Cleveland 3, Ohio has formulated "Embeco" pre-mixed mortar and pre-mixed grout. Manufacturer emphasizes that they are superior to plain sand-cement prepared mixes because they do not shrink upon hardening. Other advantages include higher compressive and impact resistant strength, ductility or toughness, oil and water resistance and fast hardening.

The Pre-Mixed Mortar is designed for patching concrete floors and steps, repairing wall seams and cracks, grouting around pipes through walls etc. The pre-mixed grout is specifically designed for grouting machinery, anchor bolts, and building columns.

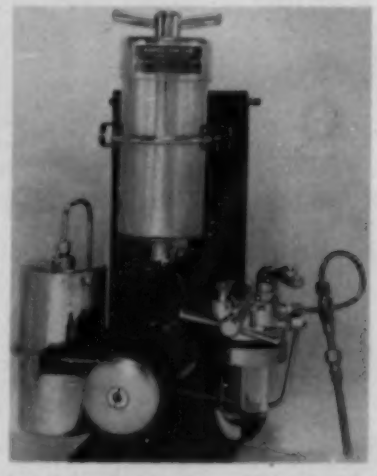
The manufacturer emphasizes that the pre-mixed grout should be used only where the grout is confined or held under restraint. For non-shrink concrete repairs and similar applications where the mortar is not confined the company recommends the pre-mixed mortar.

Engine Starter

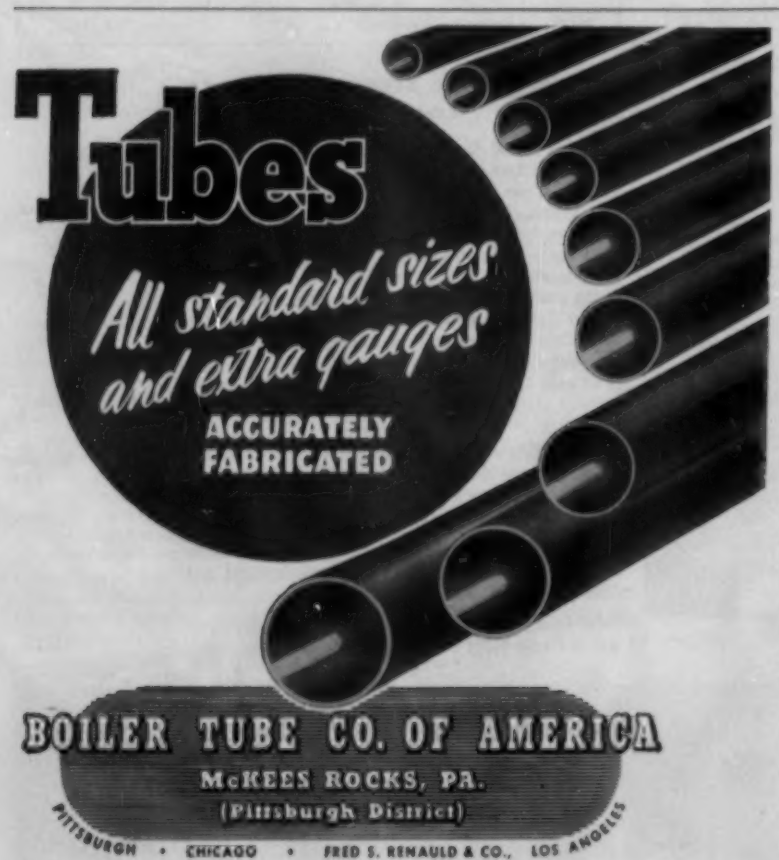
B-16 SINCLAIR REFINING COMPANY, 600 Fifth Ave., New York, N. Y., and the AUTOMOTIVE & MARINE PRODUCTS CORP., Boston 34, Mass., have placed on the market a new type of diesel and gasoline starting fluid applicator known as the Ampco-Sinclair Engine Starter, developed by Sinclair Research Laboratories, Inc., in conjunction with Ampco and manufactured by the latter firm.

Diesel engines, which are fired by the heat of compression in regular operation, are normally cranked by battery-powered motors or by auxiliary gasoline engines. When an engine must be stored and started at low temperatures, a quick injection of a fast-igniting fluid is necessary to aid starting and sustain combustion until the regular fuel maintains engine operation. Gasoline engines operating in cold temperatures may also need such starting fluid.

The Ampco-Sinclair starter works automatically in injecting the right



The Ampco-Sinclair Engine Starter provides automatically the proper amount of fast-igniting engine starting fluid needed to begin normal fuel firing when diesel engines are cold.


Tubes
All standard sizes and extra gauges
ACCURATELY FABRICATED
BOILER TUBE CO. OF AMERICA
McKEES ROCKS, PA.
(Pittsburgh District)
PITTSBURGH • CHICAGO • FRED S. RENAULD & CO., LOS ANGELES

amount of starting fluid at the proper rate of fluid flow for any engine by even an inexperienced operator irrespective of engine design, size or temperature conditions.

In special cold room tests the new unit provided rapid engine firing at temperatures down to minus 40 F. It utilizes the aerosol principle as opposed to solid starting fluid injection. It has a closed pressurized circuit which eliminates fumes and fire hazards. It is designed to receive a sealed can of Sinclair Starting Fluid, but other fluids can be used.

Tests showed that average costs of less than 5¢ per start were obtained with the Ampco-Sinclair Engine Starter using Sinclair Starting Fluid.

Packaged Boiler

B-17 ECLIPSE FUEL ENGINEERING CO., 1100 Buchanan Street, Rockford, Illinois has added a new 15 HP series to the Eclipse line of automatic "Steamboilerplants", ranging from 12 to 125 HP. The new model is available for burning gas only, oil only, or gas and light oil.

Over-all dimensions are: length, 160", width, 44", height, 61". Design and construction equals or exceeds all latest requirements of the ASME Code.

Completely assembled, the new boiler is ready for immediate operation after electricity, steam, water, fuel, and stack are connected. All necessary wiring is complete. Equipment includes burners, blower, combustion safeguards, and all necessary valves and controls.

Safety Cans

B-18 EAGLE MANUFACTURING COMPANY, Wellsburg, West Virginia has introduced a new line of safety cans for use wherever explosive or flammable liquids are handled. Five sizes are available: 1 qt., 2 qt., 1 gal., 2½ gal., 5 gal.

The three smallest sizes feature one-handed trigger-grip handle while the two largest have free-swing handles. Both types have a self-adjusting protective guard cap which prevents leakage if can is upset. Entire line is made from 24-gage tern steel which is given a red baked finish.

For more data circle item code number on the postage free post card—p. 17

Improved Quality of Plant Water Results in Lower Production Costs and Up Grading of the Product

Depleted water supplies and a consequent degenerating quality of water has caused much concern in industry. Dirty water causes increased maintenance costs and reduces the quality of many products.

The low initial cost of diatomite filters combined with their low floor space requirement and ease of operation have proved very attractive to industry. The diatomite filter will remove all silica sand, algae, organic matter and silt from water sources such as wells, rivers, or lakes. Bacteria is reduced 80% or even more in some cases. The quality of filtered water is always constant, no deterioration or variation is encountered. Add to the above that one filter can be cleaned with the output of a second filter, which eliminates the need for oversize pumps or large holding tanks for filtered water, and the reasons for the interest in diatomite filters are quite apparent.

Some examples of recent applications are:

One firm's problem was the breakage of their welding tips. The welding tips would become burned, turn brittle, and then break. Dirt in the cooling water was suspected, and Sparkler diatomite filters were put on the job. The life of the welding tips was extended eight to ten times by the use of filtered water.

Another firm has produced an off-white chemical for many years. Their source of water is a highly colored river which is heavily contaminated with industrial wastes. Sand filters had been installed for many years. When it was decided to improve the product's color, two 400 sq. ft. Sparkler diatomite filters were installed. The installation was designed to clean one filter with the output of the other. This firm now produces a true-white chemical and have been rewarded by an increased demand for their product.

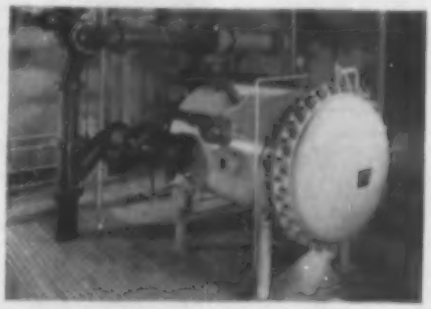
A third firm obtains their water from deep wells. It contains large amounts of very fine sand. This sand caused excessive wear in high head pumps and clogged fine fog nozzles interrupting production and increasing maintenance costs. Sparkler diatomite filters were installed on this four million gallon a day application and completely removed the above troubles.

In all of the above applications, it is apparent that an improved quality of plant water resulted in lower operating costs and improved products.

The Sparkler Model SCJ diatomite filter is designed specifically for large volume water filtration. Available in sizes up to 2000 sq. ft. of filtering surface with capacities up to 5,000,000 gal. per day in a single unit. Multiple units engineered for larger requirements.

The original cost of a Sparkler diatomite filter is about ⅔ that of a sand filter and the floor space required less than ½.

Write Mr. Dan Baldwin for engineering service and estimate on your requirements.



Crystal clear water is obtained from a pond for plant use at Trent Tube Co. with this Sparkler Model SCJ diatomite filter. Flow rate 1,152,000 gallons per 24 hr. day operation from this single filter unit.

SPARKLER MFG. COMPANY

Mundelein, Illinois

Sparkler International Ltd.
Plants at: Galt, Ontario, Canada
Amsterdam, Holland

Sparkler Manufacturing Co., Mundelein, Illinois

☐ Have engineering representative call for consultation on our water problem. ☐ Mail plant water filtering bulletin.

*Company*_____

*Address*_____

*Individual to contact*_____

Catawissa
PERFECT SEAL
Unions

HOT FORGED from solid, rectangular steel bars, designed and produced for dependable, long-life service under the severest piping conditions!

A TYPE FOR EVERY USE!
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Standard & Double Extra Heavy
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Available with screwed or socket weld ends. 3000-lb. sizes ⅛" to 3"; 6000-lb. sizes ⅛" to 2".

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With screwed or socket weld ends. 3000-lb. and 6000-lb. service.

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With steel-to-steel, bronze-to-steel, stainless steel-to-steel or orifice seats. 3000-lb. service only.

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With screwed or socket weld ends. 3000-lb. and 8000-lb. service.

WRITE FOR CATALOG 11
Showing the Complete Catawissa line of Perfect Seal Products

CATAWISSA VALVE & FITTINGS COMPANY
950 MILL ST. • CATAWISSA, PA.

News for the South and Southwest (continued)

(*Starts on page* 10)

In 30 to 50 seconds, depending on the skill of the operator, this newly-invented instrument will accurately measure the amount of pulpwood on any given truck. The old method of "hand-scaling" requires anywhere from three and a half to five minutes. The inventor of the "Scalometer"—W. R. "Skeeter" Elkins (right) of Savannah, is showing his distributor, A. Minis, of Savannah, how to operate the Scalometer at the St. Regis Paper Mill, Jacksonville.

Instrument Designed for Pulpwood Scaling

The new and revolutionary "Elkins Pulpwood Scalometer," designed to measure pulpwood accurately and quickly, was demonstrated by its inventor recently at the St. Regis Paper Company, Jacksonville, Florida.

A creation of W. R. "SKEETER" ELKINS, of Savannah, Georgia, a former pulpwood scaler, the electrical-mechanical instrument was inspected and operated by a number of members of the Southeast Technical Committee, American Pulpwood Association, who were attending a two-day convention in Jacksonville.

The Scalometer, developed after more than six years of research and experimentation, looks something like an oversized camera, equipped with tripod and scales. The operator goes through a simple, three-step procedure. He views the pulpwood load through the eyepiece; he adjusts the instrument's "scanning bars" to outline the load, and as the adjustments are made they are converted into a reading in square feet and cords on the scales above the eyepiece. The operator merely reads the total—and has the correct answer.

"I learned, by personal experience over the years, that the old hand-scaling method is inaccurate and costly," Mr. Elkins said. "You can take any two experienced hand scalers and get them to measure a load of pulpwood and they'll never come up with exactly the same answer.

"With this instrument, the danger of over-estimating pulpwood loads is decreased 5 to 10%. The instrument also cuts the present three and a half to five minute scaling time to an average of 30 to 50 seconds, depending on the operator's skill. An inexperienced operator can learn to use the instrument in a few hours."

Mr. Elkins maintains the Scalometer actually means a saving of from 50 cents to $1.50 for each cord of wood purchased by pulp mills.

Among those who witnessed the demonstration were Albert Ernest, vice president in charge of Southern Woodlands for St. Regis; John A. McDermott, St. Regis mill manager; Harry D. Johnson, assistant manager, woodlands division, St. Regis, and nearly a score of members of the Southeast Technical Committee, American Pulpwood Association.

The present Scalometer weighs about 60 lb. Arrangements for its

manufacture have been made with a subsidiary of Sperry Corporation. Distribution will be handled by Minis & Co., Inc., of Savannah, Georgia, and the instrument will sell for approximately $3,300, the inventor said.

Handicapped Workers Sort Airplane "Hardware"

Sightless workers of GEORGIA'S FACTORIES FOR THE BLIND have reclaimed in the past 12 months some $60,000 worth of "mixed" small airplane parts for reuse in making B-47 jet bombers at the Lockheed-Marietta aircraft factory.

Some 40 employees in the Griffin, Georgia, plant are sorting airplane "hardware" by touch and with the aid of specially-designed templates. For the first year of the contract with Lockheed, the plant's payroll amounted to $47,000. Approximately 56,000 pounds of mixed aircraft items—nuts, bolts, rivets, fittings, etc.—had been sorted by the plant's sightless workers and 42,000 lb of these recovered for use in making the 600 mph B-47 Stratojets at Marietta.

New Norton Plant Expands Electric Furnaces—Ala.

NORTON COMPANY, Worcester, Massachusetts, is adding to its electric furnace capacity by building a new plant in HUNTSVILLE, ALABAMA, on a 100-acre site in an area known as Hobbs Island along the north bank of the Tennessee River.

Completion is expected by the end of 1955. Total cost of land, buildings and equipment is estimated to be $1,250,000.

The new plant will produce Magnorite refractory grain (fused magnesia), fused zirconia, Norbide refractory grain (Norton boron carbide), and special products for the Atomic Energy Commission. Each of these products is finding greater application daily in the metals, chemical, ceramic, heat and power, and electrical industries. It is likely that Norton may also manufacture crude aluminum oxide and silicon carbide there at a later date.

The plant will consist of two electric furnace buildings, an office and utility building, and a research building. Power will be supplied by the Huntsville Electric System, and rail service furnished by the Nashville, Chattanooga and St. Louis Railroad.

Overall operation of the new plant will be directed by HOWARD J. DALY.

DIXISTEEL merchant bars are quality-controlled from start to finish. At each step of production — from molten steel to the finished hot-rolled product — checks and rechecks are made to assure proper physical properties, finish and tolerances.

DIXISTEEL Bars and Shapes are produced in a wide variety of shapes, sizes and grades — plain or galvanized.

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News for the South and Southwest (continued)

Industrial Crane Expands

INDUSTRIAL CRANE & HOIST CORPORATION, manufacturers of overhead cranes, jib cranes and monorail systems, have moved to new enlarged office and plant facilities at 1536 South Paulina Street, Chicago 8, Illinois.

Paul W. Pearson, President, states that with 160,000 sq ft of space now available and with installation of considerable new machinery and equipment the company has more than doubled manufacturing capacity for its expanded line of cranes.

Dwight-Lloyd Appoints General Machinery—Ala.

DWIGHT-LLOYD, INC., division of Sintering Machinery Corp., 325 Sinter Ave., Netcong, N. J., announces the appointment of GENERAL MACHINERY COMPANY, 1600 Second Ave. South, BIRMINGHAM, ALABAMA, to handle their complete line of continuous weighing and feed regulating scales in northern ALABAMA.

Allis-Chalmers—W. Va.

WHEELING RUBBER PRODUCTS, INC., 927 Market Street, WHEELING, W. VA., has been named a distributor by ALLIS-CHALMERS for "Texrope" V-belt drive equipment in six West Virginia and three Ohio counties. The company is headed by R. A. CHARLTON.

A-C and U. S. Steel Sign Tullahoma, Tenn., Contract

ALLIS-CHALMERS MANUFACTURING COMPANY and the Consolidated Western Steel Division of UNITED STATES STEEL have announced the signing of a joint-venture contract totalling $6,255,076 for the design, procurement, manufacture and construction of the plenum evacuation system at Arnold Engineering Development Center, TULLAHOMA, TENN.

The plenum evacuation system is for the Development Center's propulsion wind tunnel. Allis-Chalmers will design, construct and supervise installation of auxiliary compressors, motors, switchgear and transformers.

Consolidated Western will be responsible for the administration, design, procurement, manufacture and installation of all general construction for the rest of the project, including installation of Allis-Chalmers equipment.

ASTE San Antonio Chapter

The AMERICAN SOCIETY OF TOOL ENGINEERS recently formed a new chapter at SAN ANTONIO, TEXAS. EDGAR F. MEASELS, equipment specialist at Kelly Air Force Base and chairman of the new chapter, received the charter from H. E. COLLINS of Houston, ASTE vice president.

Other charter officers are JAMES F. METCALF, first vice chairman; OSCAR G. TOBIAS, second vice chairman; ALTON A. HENSEN, secretary; and MAYNARD B. BERG, treasurer.

Wm. S. Ginn Heads G.E.'s Transformer Division

WILLIAM S. GINN, a native of Atlanta, Georgia, has been appointed general manager of GENERAL ELECTRIC COMPANY'S Transformer Division at Pittsfield, Mass., to succeed Francis E. Fairman, Jr., who recently resigned because of ill health. Mr. Fairman will continue to serve as consultant.

Mr. Ginn will head a division composed of plants located in seven cities throughout the United States, including the Locke Department in BALTIMORE, MARYLAND and the Power Transformer Department's plant in ROME, GEORGIA.

Mr. Ginn has been general manager of the Power Transformer Department for the past two years. He joined G.E. in 1936 after graduation from Georgia Tech.

Kuhlman Electric Expands

KUHLMAN ELECTRIC COMPANY, Bay City, Mich., now celebrating its 60th year in the electrical industry, has announced plans for expansion of its power and distribution transformer and electric furnace factory space and sales coverage. An addition is being built at the company's main plant in Bay City, and the company is establishing a Western Division in California.

Waugh-Morrison Represents Insul-Mastic Corp.—Tenn.

THE WAUGH-MORRISON COMPANY OF KINGSPORT, TENNESSEE, is now the licensed representative of the INSUL-MASTIC CORPORATION OF AMERICA in the eastern Tennessee and western Virginia, North Carolina district. The company will sell and apply heavy asphaltic protective coatings.

Reynolds Reduction Co. Elects Vice Presidents

Vice presidents recently elected by REYNOLDS REDUCTION COMPANY OF RICHMOND, VIRGINIA, a subsidiary of REYNOLDS METALS COMPANY, are: W. MONROE WELLS of Richmond, Virginia; J. C. BLACK, Hot Springs, Arkansas; W. W. BINFORD, Little Rock, Arkansas; and E. J. APPEL of Portland, Oregon.

Mr. Wells, a veteran of 35 years in the aluminum industry, joined Reynolds in 1946, and has been assistant vice president in charge of operations.

Mr. Black became associated with Reynolds in 1940 as superintendent of the aluminum reduction plant at Sheffield, Alabama. He was made general manager of the eastern reduction division of the Reynolds Metals Company in 1954.

Mr. Binford has been with the company since 1940, and has been general manager of the alumina division since June.

Mr. Appel became production engineer at the Sheffield plant in 1940, and since June he has been general manager of the western reduction division of Reynolds Metals Company.

Graver Water Conditioning Opens Houston Office

H. T. Sulcer, Vice President and General Manager of GRAVER WATER CONDITIONING CO., has announced the opening of a new Texas district Office at 5343 McCormick Street, HOUSTON, TEXAS. This Graver district office will be managed by JAMES J. HANRATTY and will serve all of Now Mexico and Texas except the northern part of the Panhandle.

Mr. Hanratty has been with Graver for many years and is very well versed in all phases of industrial and municipal water treatment and industrial waste treatment.

For every originator you find an imitator. The imitator substitutes words for years of work and leadership. He says "just as good" when faced with genuinely new and improved welding materials. He answers high quality with "me too." The originator gives you profitable solutions to the problems of welding with conventional high heat materials. You can solve these problems, too, but . . .

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. . . the "Low Heat Input" metal joining process helps your maintenance man . . . who usually has only one chance to get a perfect weld to avoid downtime, delays and replacement . . . and who has for 15 years proved the value of Eutectic "Low Temperature Welding Alloys" for both maintenance and production.

He can show you new savings in time, labor and materials for many reasons. In his kit he brings you 50 pioneering years of research resulting in "Low Amp" EutecTrodes and "Low Temp" EutecRods. He brings you the combined "know-how" of 350 District Engineers who exchange their newest answers to problems just like yours.

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ARE "BETTER, FASTER, CHEAPER"

Here's help in telling the originator from the imitator in welding materials. It's "A Certified Report on 7 Comparative Weldability Tests of Arc and Torch Welding Materials." It's proof in 8 pages of text and unretouched photographs compiled by a famous independent testing laboratory that only from Eutectic can you get the advantages of genuine "Low Temperature Welding Alloys." It gives you all the answers to dangerous substitutions. And it's FREE . . . just ask for TIS 2266.

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News for the South and Southwest (continued)

G. Mack Wynn Promoted by Auto-Soler Company

Promotion of G. MACK WYNN from vice president in charge of production to the newly created position of executive vice president of the AUTO-SOLER COMPANY was announced this week by William H. Wilkerson, president of the Atlanta, Georgia, concern. In his new position Mr. Wynn will seek to coordinate all departments of the company for greater efficiency to meet demands of increasing sales.

Born in Jasper, Florida, Mr. Wynn enrolled in the Georgia School of Technology, Atlanta, in 1920, graduating in 1925 with the degrees of Electrical and Mechanical Engineering.

In 1921 he became employed by the Georgia Power Company as a co-op student. He went on full time with this concern after graduation and

G. Mack Wynn

filled respectively the positions of junior engineer, engineer, superintendent of surveys and chief of the Civil Engineering Section.

Mr. Wynn collaborated in the design of the original Auto-Soler, and when the Auto-Soler Company was founded in 1932, he became a charter stockholder and was elected to the Board of Directors, where he has served continuously since. In 1947 he joined Auto-Soler Company full time as standards engineer and chief of the company's employee relations. Later that year he was promoted to assistant production manager and the following year was made vice president and factory manager. In 1948 he was promoted to vice president in charge of production. Auto-Solers (for the shoe service industry) and Auto-Nailers (for the furniture and woodworking industries) are today in use in all parts of the world.

Ford Ch. Chemist of Florida Chemists & Eng.

WILLIAM C. FORD, graduate of Michigan State College with a major in Chemistry, has been appointed Chief Chemist at FLORIDA CHEMISTS AND ENGINEERS, INC., 1709 N. Mills Street, Orlando, Florida. Announcement of the appointment was made by the firm's president, Robert A. Nanz. The company serves industry as consulting chemists and engineers.

Westinghouse Expands Kansas City Operations

Plans to build new jet engine research and development facilities costing more than $12½ million have been announced by WESTINGHOUSE ELECTRIC CORPORATION. The expansion program was announced by W. W. Smith, manager of the Westinghouse Aviation Gas Turbine Division, Kansas City, Mo.

The new facilities—which include both high- and low-power laboratories and an experimental engineering shop—will be located at the present site of the huge jet engine plant south of Kansas City. A portion of the more than 230,000 sq ft laboratory will be made available within the confines of the existing 80-acre building. The high-power and fuel testing laboratories will be constructed adjacent to and north of the present structure.

The new laboratories will provide for research and development testing on components of new jet engine designs, and for development of improvements in existing jet engines. The experimental shop will manufacture newly designed components, as well as complete experimental engine models.

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on lubricating work with

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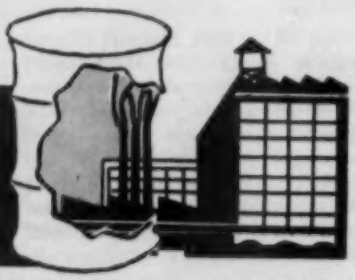
PRESSUREGREASE
Universal



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Albany Pressuregrease Universal takes the place of four or more separate greases used heretofore . . . cuts down inventory and calls for only one grease gun . . . speeds up lubrication work and saves you money.
Engineers like the way Albany Pressuregrease Universal clings to metal at all temperatures. Its high resistance to moisture prevents rust. Assures cleaner floors because it will not run off at high temperatures or high speeds. Ask for it at your mill supply house.

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Personnel Changes at Alabama Power Company

THOMAS W. MARTIN, chairman, and L. M. SMITH, president of Alabama Power Co., have announced a number of executive advancements and reassignments brought about by the retirement of E. W. ROBINSON, vice president and general manager, after 31 years of service. Mr. Robinson will be retained as a consultant to the Engineering and Construction Department.

WALTER BOULDIN, financial vice president since 1952, a native of Alabama, will become the executive vice president to whom the Treasury, Sales and Claims Departments will report.

H. NEELY HENRY, who has been vice president in charge of employee relations since 1952, will become the executive vice president to whom the Employee Relations, Land Purchasing, Traffic and Office Buildings Departments, and the manager of electric operations will report.

The newly created post of manager of electric operations will be filled by R. L. HARRIS, who has been manager of production since September, 1951. The Production and the Transmission and Distribution Departments will report to him.

C. T. BRASFIELD, JR., becomes executive engineer. He has held the positions of distribution engineer, supervisor of service, superintendent of miscellaneous operations, assistant to the operating manager and assistant to the general manager.

J. A. KEENE, who has been superintendent of production since September, 1951, will succeed Harris as manager of production. He joined Alabama Power Company in 1943 as assistant superintendent of production after extensive experience in steam generating plants elsewhere.

W. W. EBERHARDT will fill the newly created post of assistant manager of production.

B. R. WALL, who has been superintendent of Barry Steam Plant, will become superintendent of Gorgas Steam Plants.

C. E. FOWLER, who has been superintendent of Chickasaw Steam Plant, will become superintendent of Barry Steam Plant.

A. Z. ROBINSON, who has been assistant superintendent of Chickasaw Steam Plant, will become Superintendent of Chickasaw Steam Plant.

F. L. CLAYTON, who has been assistant superintendent of Gorgas Steam Plants, will become superintendent of Gadsden Steam Plant.

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FOR YOUR COMFORT
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MOST FLEXIBLE. You can reach and hold any condition in response to instrument settings, or vary it as you wish.

EASIEST TO TAKE CARE OF. The machine is accessible, the control circuits are simple and easy to operate, and there are no solids, salts or solutions to be handled.

MOST COMPACT. It does a very large amount of work in a small space.

INEXPENSIVE TO OPERATE. At normal atmospheric temperatures (unlike systems that use refrigeration to dehumidify) it needs no summer re-heat.

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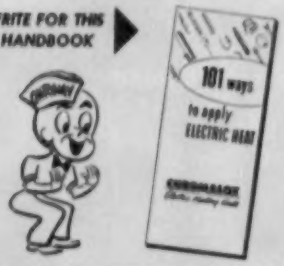

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News for the South and Southwest (continued)

Swartwout—Southwest

Appointment of A. RAY WAGNER as southwest district resident sales and service engineer has been announced by THE SWARTWOUT COMPANY, producer of process control, power plant, and industrial ventilation equipment.

A. Ray Wagner

Mr. Wagner is well-known in the instruments field. He has been associated in both sales and service by several large instrument manufacturers, as well as with large users in the chemical process field.

Mr. Wagner, who will work out of the Houston, Texas, regional office of The Swartwout Company, will make his headquarters at 1516 North Yale, Tulsa, Oklahoma.

Kansas City Welding Show Scheduled for June 8-10th

THE AMERICAN WELDING SOCIETY will produce its third annual Welding Show, at the Municipal Auditorium, KANSAS CITY, Mo., June 8 to 10, inclusive, according to Joseph G. Magrath, national secretary. The show will be the first national heavy industry exposition ever to be staged in Kansas City.

Concurrently with the show, from June 7 to 10, the society will conduct its annual Spring Technical Meeting in the same city.

"The decision to take the show to Kansas City is in line with the society's program to extend the knowledge of the science to all American industry. New developments in welding have been so numerous in recent years that many production and maintenance executives have found it difficult to keep pace with them.

"An exposition, by demonstrating the equipment under simulated factory conditions, is a great teaching medium. Kansas City, the hub of the Mid-Continent, is only one day's travel from most industrial centers in the country, and is ideal from the standpoint of extending the frontiers of our knowledge. The expanding industrial areas of the South, the Southwest and the West will profit most by producing our exposition in Kansas City," he said.

Exhibit space taken by manufacturers already exceeds the total used at the society's show in Buffalo last Spring and more than 95 per cent of the available space in the Kansas City auditorium was contracted for prior to the first public announcement of the show.

Swift & Company Opens Dallas Adhesive Plant

A new Swift & Company adhesive plant was recently opened in Dallas, Texas. W. C. LOEFFEL, a member of the adhesive sales division of Swift since 1947, will manage the new Dallas installation.

Designed to provide increased production capacity for prompt service on the company's adhesive business throughout the Southwest, the new plant will incorporate the most modern equipment and procedures for producing adhesives.

Dykins Mgr. of Utilities for The Kuljian Corporation

DANIEL H. DYKINS, well-known engineer with a long record of important work in the public utilities field, has been appointed Manager of Utilities of THE KULJIAN CORPORATION, engineers and constructors, with headquarters in Philadelphia. Mr. Dykins will maintain contact with Kuljian clients engaged in power plant and other utility projects both in the United States and foreign countries.

Mr. Dykins has represented The Kuljian Corporation for nearly ten years in the negotiations for steam generating stations for the Florida Power Corporation, The Central Electric Power Cooperative at Chamois, Missouri, and many others. He has also supervised surveys and reports on power projects in Texas, Louisiana, Missouri, and Virginia.

A. Milne & Co.—Ft. Worth

A. MILNE & COMPANY, N. Y., N. Y., nationwide distributors of solid and hollow tool steels announces the appointment of MAXWELL STEEL CO., INC., Fort Worth, as exclusive distributors for Milne steels in the state of Texas.

Kentucky Carbide Plant in Full Operation

WESSON METAL CORPORATION has completed its new ultra-modern, 40,000 sq ft cemented carbide metals plant at LEXINGTON, KENTUCKY. The plant is now in full operation.

Announcement of the start of production in the new plant is made by JAMES A. FRASER, president of the firm which is a major producer of cemented carbides for metal cutting applications.

Federal Pacific Electric Moves Houston, Tex., Office

The Houston, Texas, sales office of FEDERAL PACIFIC ELECTRIC COMPANY, Newark, New Jersey, has been moved to the Bermac Building, Room 202, according to Robert C. Graves, vice president in charge of sales. The office is under the supervision of MR. T. BEYERT, branch manager in Houston.

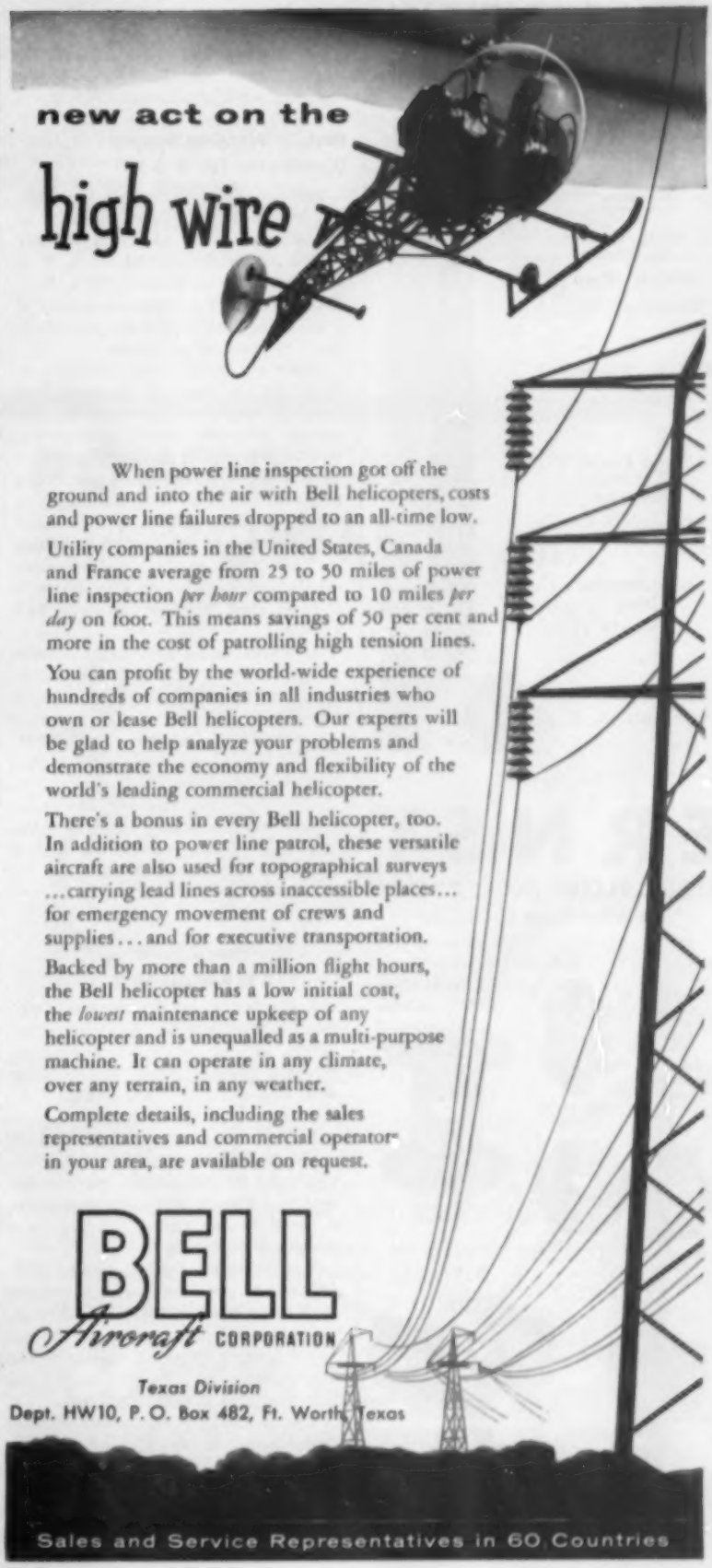
Houston is part of the Central Sales Region, one of the several geographical regions created by Federal Pacific to expedite their rapidly growing sales activities across the country. The Central Region, with headquarters in St. Louis, Missouri, is managed by W. M. Stark.

Morse Chain Company Names New Southern Distributors

MORSE CHAIN COMPANY, manufacturer of power transmission equipment, has announced the appointment of several new distributors.

Included are SOUTHERN BEARINGS SERVICE COMPANY with offices at 491 S. Second Street, Memphis, Tennessee and 519 W. Seventh Street, Little Rock, Arkansas; L. B. ADAMS & COMPANY, with offices at 530 N. 49th Street, Baton Rouge, Louisiana; and NEIMAN BEARINGS COMPANY with offices located at 2837 Locust Street, St. Louis 3.

All firms will handle the complete line of Morse products including roller and silent chain drives, cable chain, Hy-Vo drives, flexible couplings, torque limiters and clutches.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high wire
When power line inspection got off the ground and into the air with Bell helicopters, costs and power line failures dropped to an all-time low.
Utility companies in the United States, Canada and France average from 25 to 50 miles of power line inspection *per hour* compared to 10 miles *per day* on foot. This means savings of 50 per cent and more in the cost of patrolling high tension lines.
You can profit by the world-wide experience of hundreds of companies in all industries who own or lease Bell helicopters. Our experts will be glad to help analyze your problems and demonstrate the economy and flexibility of the world's leading commercial helicopter.
There's a bonus in every Bell helicopter, too. In addition to power line patrol, these versatile aircraft are also used for topographical surveys ...carrying lead lines across inaccessible places... for emergency movement of crews and supplies... and for executive transportation.
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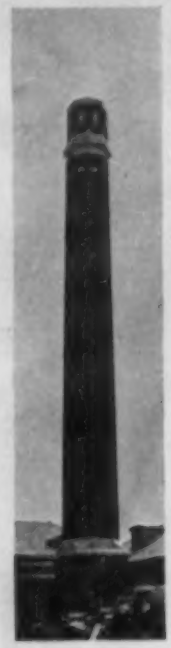

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FIG. 29 Cylinder with Impeller

FIG. 17-28 Cylinder

FIG. 215 Flanged

FIG. E-37 Double Window

FIG. 213 Visibility Welding Neck or Screw

FIG. E-811 Flapper

FIG. E-1810 Rotating Wheel Type

All sizes up to 6" *Send for Catalog*

ERNST WATER COLUMN & GAGE CO.
LIVINGSTON, N. J.

News for the South and Southwest (continued)

Mobile Welding Supply Distributor for K S M

MOBILE WELDING SUPPLY CO., INC., has assumed the distributorship of arc welding studs and stud welding equipment manufactured by K S M Products, Inc. of Merchantville, N. J. They will carry a complete supply of conventional welding studs and equipment in stock at all times.

CLIFF H. WYATT and THOMAS M. TAUL, JR., partners in the firm, both have extensive backgrounds in supplying industry with conventional welding equipment and supplies. They have recently completed a training program at the K S M plant in New Jersey and can render qualified service to the many users of stud welding in this area and to metalworking plants and contractors who desire to include stud welding in their production.

The area to be serviced by MOBILE WELDING SUPPLY Co. includes Mobile, southern Mississippi and eastern Louisiana. The ten western counties of Florida will be covered by PENSACOLA WELDING SUPPLY CO., a branch of the company in Pensacola.

K S M also provides the services of a field engineer, MR. RICHARD SAWYER, who operates out of the K S M field office in BIRMINGHAM, ALA.

New Pritchard Building Opened in Kansas City

J. F. PRITCHARD & COMPANY, engineers, constructors and manufacturers, is now located in their new, modern general office structure at 4625 Roanoke Parkway, Kansas City, Mo.

Incorporating approximately 46,000 sq ft of floor space, including basement, the new structure contains executive offices, a large drafting room, a conference room, library and modern private offices.

J. F. Pritchard & Company, J. F. Pritchard, president, was organized in Kansas City in 1920, and through the years has become one of the nation's leading firms of engineers and constructors for the petroleum, gas, chemical and power industries.

The company's operations extends from coast to coast, and includes many foreign countries. In addition, a subsidiary company, the J. F. Pritchard & Company of California is one of the nation's principal manufacturers of industrial and air conditioning cooling towers, air-cooled heat exchangers, and other specialized gas and air treating equipment.

Apart from its Kansas City general offices, Pritchard has district sales offices in New York, Pittsburgh, Chicago, St. Louis, Tulsa, and Houston. A branch engineering office is located in New Orleans. The Pritchard redwood fabrication plant, which manufactures component parts of cooling towers, is located at Merced, California.

Westvaco Building W. Va. Anhydrous Ammonia Plant

THE LUMMUS COMPANY, 385 Madison Avenue, New York, international designing engineers and constructors for the petroleum and chemical industries, announces that it has been awarded the contract to engineer and construct a 60 ton/day anhydrous ammonia plant for WESTVACO CHLOR-

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CARDS

ALKALI DIVISION of Food Machinery and Chemical Corporation. Engineering is already underway for this plant to be located at South Charleston, West Virginia, with completion scheduled for late 1955.

The plant will obtain hydrogen from electrolytic cells and will utilize the latest innovations in mechanical design and equipment. It will be instrumented to reduce operating expenses to a minimum.

Vepco's Capacity Now Exceeds 1,000,000 kw

A new, 100,000 kilowatt unit costing $14,000,000 that doubles the electric power generating capacity of the Virginia Electric and Power Company's Portsmouth (Va.) station went into full load commercial operation only three days after steam was first turned into the turbine.

Completion of the second unit at Portsmouth brings the Vepco system's total generating capacity to more than 1,000,000 kilowatts, or more than two and one half times its capacity at the end of World War II. The new addition brings to nearly $32,000,000 Vepco's investment at Portsmouth. The Power Company's expenditures in 1954 total approximately $62,000,000 for extensive electric and gas generating facilities, including the latest Portsmouth unit.

Effective Management

(*Starts page* 74)

an extensive inspection and overhaul.

The Pay Off

Once the cost analysis is followed religiously by the manager, it will focus his attention on many items of waste, inefficiency, or just plain accounting errors which have previously cost him money. How much was paid for raw material this month as compared to previous months? How much was charged against the plant's account for transportation? How many dollars are spent each month for depreciation, factory overhead, and insurance and taxes?

When the plant manager has, in his endeavor to spend the allotted operating dollars most economically, established a logical procedure for reviewing, reporting and comparing each month's cost, then he is effectively demonstrating to those under him the economic principles of scientific management.

Certainly, the information just presented on records and reports by no means exhausts the subject; rather we might say that the surface is only scratched. The main point which the conscientious plant manager will want to remember about paper work, which so many people regard as just a necessary evil, is that good records do pay dividends not only as an aid in efficient plant operations but as an inventory of past history for a future new manager who may be replacing the present head supervisor if the company recognizes him for a job well done.

Next month Mr. Pounds will conclude this series with a paper on SUPERVISION.

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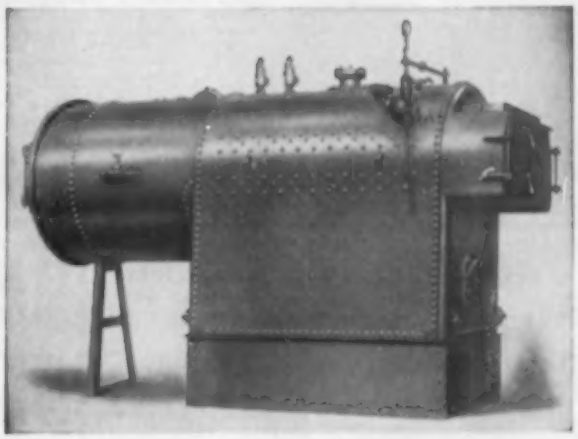

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WHAT'S NEW and Where to Get It

FOR FREE INFORMATION—Circle code number on page 17 or 18

N-1 **LUBRICATION** — Bulletin 103, 4 pages — "Fringe Area Lubrication With Molykote Lubricants"—describes new concepts of extreme pressure or boundary lubrication in which solid lubricants perform a major function. Eleven major types of the company's molybdenum disulfide lubricants are listed and described according to their ingredients, working temperature ranges and method of application. Ten industrial and power plant applications are featured.—THE ALPHA CORPORATION, 65 Harvard Ave., Stamford, Conn.

N-2 **STEEL BUILDINGS** — Catalog No. 2, 26 pages—Photographs show Star steel buildings in use by specific plants in various industries including warehouses, gins and mill buildings, factories, and many others. Construction details are explained; and building components, estimating data sheet, sample floor plan, and engineering service are covered.—STAR MANUFACTURING COMPANY, 3012 South Stiles, Oklahoma City, Okla.

N-3 **EXHAUST FANS** — Catalog No. 500-B—Features the S-2 Exhaust Fan; describes various applications, types and construction. Complete dimensional data and capacity tables to assist in selection. Engineering data for standard and long-cone Cyclone Separators included.—FORT WORTH STEEL & MACHINERY CO., Box 1036, Fort Worth 1, Texas.

N-4 **ALUMINUM JACKETING** — Folder No. J-25, 4 pages — Contains complete application instructions for Childers Jacketing for weather-proofing of insulated lines, towers, vessels, and tanks. Illustrated with detailed drawings.—CHILDERS MANUFACTURING CO., Box 7447, Houston 8, Texas.

N-5 **INDUSTRIAL TRAPS**—Bulletin No. 800, 12 pages—Illustrates and describes the "Unitrap," an all purpose, universal steam trap for pressure ratings of 0 to 250 lb. Covers design, construction, operation, and other pertinent information. Includes steam pipe selection chart.—PERFECTING SERVICE CO., 332 Atando Ave., Charlotte, N. C.

N-6 **WATER CLARIFICATION** — Catalog 280, 28 pages—A thorough, technical discussion of a new approach to the solution of stream pollution problems. Causes of water pollution (sizes finer than #150 to #200 mesh) can be isolated by a combination of mechanical screening and hydraulic classification. Water clarification process described is based on gravity. Technical data deals primarily with integration of coal preparation and water clarification processes. However, materials other than coal will also respond to the same or similar treatment.—HAWORTH ENGINEERING & MANUFACTURING COMPANY, 920 Second Ave., No., Birmingham 4, Ala.

N-7 **STEEL TANKS**—Catalog, 52 pages —Gives examples of production and custom steel fabrication offered in storage tanks, fuel tanks, all types of refinery vessels, transport tanks, expanded linepiped anhydrous ammonia systems, and other plant equipment. Extensively illustrated with plant and equipment photographs.—MASTER TANK & WELDING, P. O. Box 5146, Dallas, Texas.

N-8 **ELECTRIC HOISTS**—Bulletin 618-9-4, 6 pages — Describes electric hoists for big lifts, 4 to 15 ton capacities, featuring load-inching controls and light, compact design. Plant photographs show specific applications of equipment, and cutaway view gives construction details and components.—R. G. LeTOURNEAU, P. O. Box 2037, Longview, Texas.

N-9 **STEEL CASTINGS** — Bulletin, 4 pages — Illustrates and describes high quality carbon and alloy steel castings available for a variety of industrial uses. Photographs show plant facilities, and engineering and design services for particular applications are offered.—TEXAS STEEL COMPANY, 3901 Hemphill St., Fort Worth, Texas.

N-10 **V-BELT DRIVE MANUAL** — Bulletin 197—Contains sections on selection tables, drive design, sheaves, pulleys, and V-belts for use by design, purchasing, production and maintenance departments. Manual has a complete listing of pre-engineered stock drive tables. When using any standard motor it is simple to choose a drive with the proper horsepower capacity, center distance, belt length, and driven speed.—T. B. WOOD'S SONS COMPANY, Chambersburg, Pa.

N-11 **CONTINUOUS BLOWDOWN SYSTEM**—A simplified chart helps to determine the savings possible through heat recovery with a properly sized Automatic Continuous Blowdown System. Incident to the savings determination is the rate of boiler blowdown for the water conditions and the selection of a correctly sized heat exchanger. The chart is based on total dissolved solids in the boiler water and the permissible concentrations to determine total blowdown. When blowdown quantities are known, selection of heat exchanger and savings can be determined with a single chart.—HENSZEY COMPANY, Watertown, Wis.

N-12 **MAGNETIC PARTICLE TEST UNIT** — 8-page booklet "Magnaflux Portaflux—New Portable Magnetic Particle Test Unit" describes the economical method for checking ferrous objects for surface discontinuities. Features photos, drawings and diagrams, and gives a complete description of the basic principle on which magnetic particle testing is based.—NORTH AMERICAN PHILIPS COMPANY, INC., Mount Vernon, N. Y.

N-13 **MAINTENANCE CLEANING PROBLEM** — Data sheet "Preventive Maintenance Cuts Replacement Costs" features the problem of restoring five water filters to efficient operating condition without replacing the filter beds. Illustrated bulletin describes complete chemical solvent cleaning method employed on the job. —DOWELL INC., Tulsa 1, Okla.

N-14 **BUS DUCT**—Bulletin 200, 24 pages —Shows how bus duct meets industry's demand for more flexible power distribution. Connections of 10 ft. lengths of duct which can be made from either side, as well as the types of tap boxes, end closers and plug-in units employed, are shown. "Plug-Duct" hangers permit installation in any plane to reduce installation time, and avoid necessity for pre-engineering their locations. Application and dimensional data plus specifications are included.—CONTINENTAL ELECTRIC EQUIPMENT COMPANY, Box 1055, Cincinnati 1, Ohio.

N-15 **BATTERY SELECTION**—Bulletin 210, 20 pages—covers storage batteries for standby power, emergency lighting and switchgear applications. Charging equipment and simplified battery maintenance techniques are included; storage battery installation procedures are described and illustrated. Publication is designed for engineers and supervisory personnel in industrial, power, and large service plants.—EXIDE INDUSTRIAL DIVISION, The Electric Storage Battery Company, Box 8199, Philadelphia 1, Pa.

N-16 **WATER CONDITIONING** — 6 page folder "Chemical Control and Testing" emphasizes the need for intelligent chemical control and testing to assure the success of a water conditioning program. Folder gives examples of the varying needs for testing equipment for different types and sizes of plants.—HALL LABORATORIES, INC., Hagan Building, 322 Fourth Avenue, Pittsburgh 30, Pa.

N-17 **DRAFT GAGE** — Publication 54-1060-210, 4 pages—describes diaphragm operated Verticale Gages, a completely new design in draft gages. Can also be employed for remote indication of pressure, flow, level, temperature, O2 in flue gases, etc. Removable units, "one man" zero check and other features are described. —THE HAYS CORPORATION, Michigan City, Ind.

N-18 **ROTARY FEEDERS**—4 page bulletin describes the sealed rotary feeder for pressure or vacuum feed and a standard unit for normal feed. Normally manufactured of cast iron, both units are also available in non-corrosive metals for corrosive or abrasive applications. Bulletin includes plan and elevation drawings and complete list of size and mounting dimensions. — BEAUMONT BIRCH COMPANY, Philadelphia, Pa.

N-19 **MOTOR CONTROL CENTER**—Bulletin No. 402, 8 pages—explains how "Concentrol" standardized modular structures concentrate a larger number of motor controls in one complete "packaged" unit. Illustrations show details of design and construction features. Layout and short circuit application data, as well as dimensions, ratings and specifications are included. —ELECTRIC EQUIPMENT CO., Box 1055, Cincinnati 1, Ohio.

N-20 **PIPE JOINING TECHNIQUE**—10 page bulletin describes the EB Weld Insert process which permits deposition of a root pass which produces a smooth and uniform weld surface even though the actual welding is done on one side only. Especially suitable for the butt welding of stainless and alloy steel pipe, both seamless and welded. Step by step information with sketches and photographs, explains how to use the insert and process.—ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Pa.

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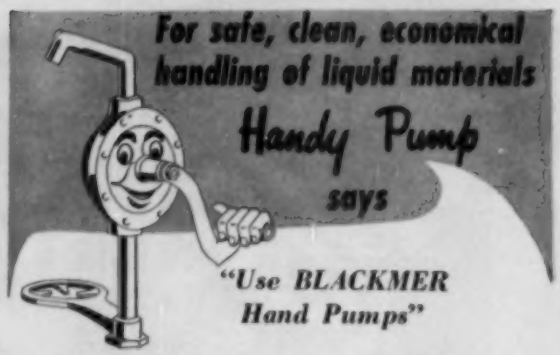

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Cummins Engine—St. Louis

CUMMINS ENGINE COMPANY, INC., has announced the appointment of M. W. BROOKS as Regional Manager, Mid-West District—Central Region, with headquarters at 707 Shell Building, 1221 Locust Street, St. Louis 3, Missouri. Until recently Mr. Brooks headed the Industrial Power Division of White Motor Company, and previous to that he was Cummins Regional Manager—Great Lakes Region at Cleveland.

Georgia Tech Constructing Electronic Computer Center

By late summer of 1955, the GEORGIA INSTITUTE OF TECHNOLOGY in Atlanta, Georgia will complete its $1,000,000 Rich Electronic Computer Center, one of the largest and most complete of its type in the South. Ground was broken for the two story building late in December, 1954. The building is expected to be completed within six months and the center in operation by late summer of '55.

The services of its medium-size and large digital electronic computers will be made available to southeastern industry and business. At Georgia Tech, the two computers will be used in the research activities of the Institute as well as for the training and education of students in this new rapidly expanding field.

Detrex Building Kentucky Plant

Construction of a new million-dollar plant in BOWLING GREEN, KY., to house the Drycleaning Division of THE DETREX CORPORATION, major manufacturer of chemicals, industrial metal-cleaning machinery and drycleaning equipment, is now under way.

Built under the supervision of The Austin Company, general contractors, the 100,000 sq ft plant is scheduled to be completed by April, 1955.

The new building will produce all Detrex drycleaning machinery. Up to now, this production has been integrated with the manufacture of the company's metal-cleaning equipment in the main Detrex plant in Detroit.

$$$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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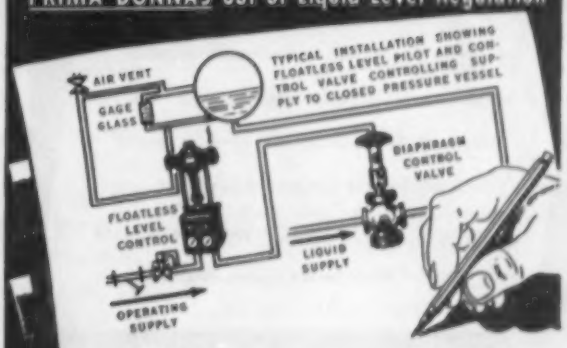
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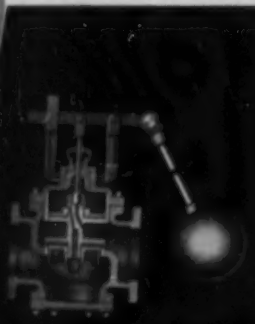

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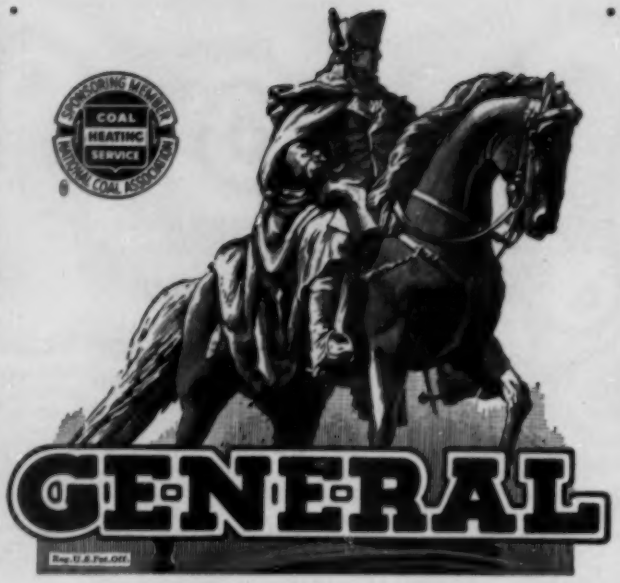

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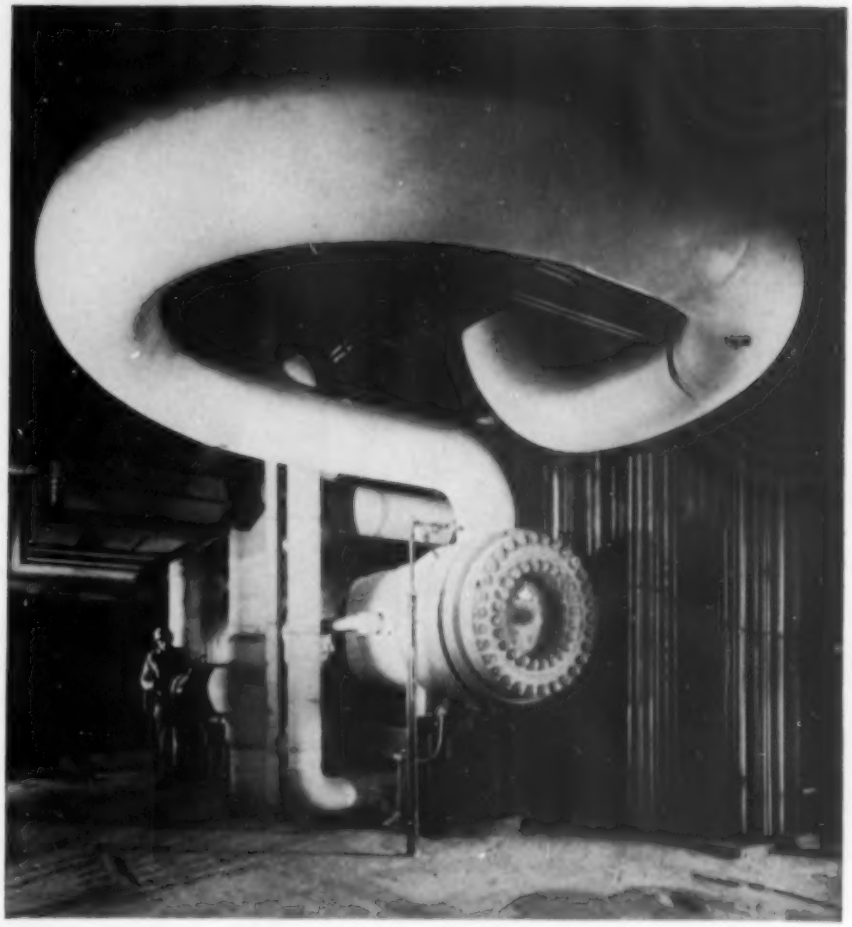
This TVA "efficiency curve" starts at a Lummus feedwater heater!



Lummus feedwater heaters contribute materially to the efficiency of the largest power-producing system in the United States—the Tennessee Valley Authority network. At key steam electric stations—like Johnsonville . . . Widow's Creek . . . Shawnee . . . Kingston . . . John Servier—a total of 160 high and low pressure Lummus heaters are in service or are scheduled for installation.

For Johnsonville alone Lummus has furnished 30 feedwater heaters for six 112,500 KW turbine generating units. Two of the heaters incorporating 2,400 and 2,760 sq. ft. of tube surface are in low pressure service, designed for a pressure of 250 psi and a temperature of 300° F. The other three heaters, with tube surfaces ranging up to 5,707 sq. ft., are designed for a pressure of 2,500 psi, at temperatures of 450° F., 650° F., and 800° F., respectively.

Use of the patented LUMMUS MULTILOK® Closure at the channel ends of high pressure heaters, as pictured here, assures tight, trouble-free heater performance.

The association of Lummus with TVA (and with many other major power projects in the United States and abroad) is not just a coincidence . . . but springs from Lummus' engineering skill, manufacturing ability and proven product performance. That's why we urge you to call in Lummus for your next heat transfer project.

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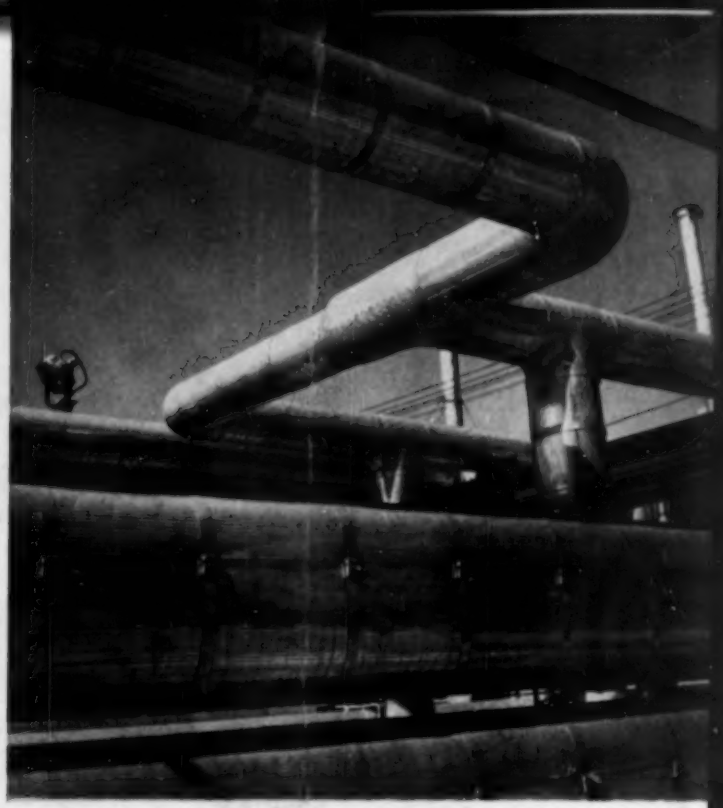
How Olin Mathieson Uses Childers Jacketing For Insulated Lines

Jacketing problems at new plant ranged from covering tall towers to irregularly-shaped heat exchangers. Read how aluminum jacketing solved these problems.



More than 244,000 square feet of Childers .006" Jacketing and 35,000 square feet of heavy weight Childers Jacketing was used in this new Olin Mathieson plant to weatherproof insulated lines, towers and vessels. Close-up above shows how aluminum jacketing was applied with strapping and seals.

Low first-cost, long life, and easy installation were the big reasons Olin Mathieson Chemical Corporation used Childers Aluminum Jacketing for outdoor insulated lines in their new Brandenburg, Ky., petrochemical plant.

Mathieson used Childers standard weight Jacketing on their insulated lines. Heavier weights of Childers Jacketing were used on high towers and vessels where a stiffer material was needed to support the vertical weight of the jacketing.

Engineers report that Childers Jacketing is inexpensive to apply. It comes in easy-to-handle rolls 4 ft. wide and 100 ft. long. Just pliers and a pocketknife are the only tools needed to apply. And because the jacketing is aluminum it needs no painting . . . stays clean and new looking even after years of service.

Childers Jacketing is easily removable, too. Just remove the strapping and jacketing can be taken off for inspection of the lines. Then same jacketing can easily be put back on the insulated line.

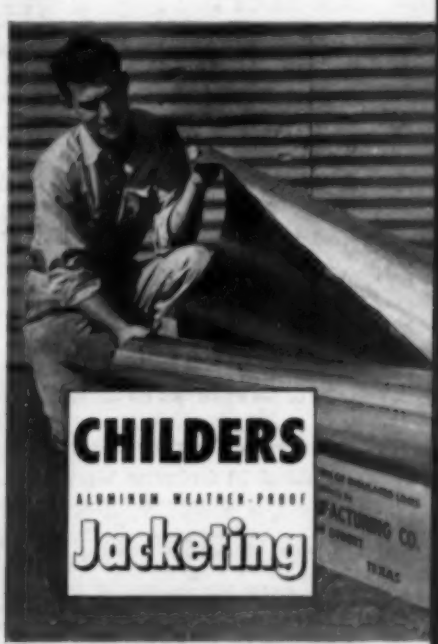
Immediate shipment from our large factory stocks can eliminate costly delays in construction or plant improvement schedules.

Try this low-cost protection in your plant. Write today for engineering data and information. You can order a 400 sq. ft. roll to test on one of your insulated lines. No obligation. Address: Childers Manufacturing Company, Department IP-2, 3620 West 11th St., Houston, Texas.

How to apply Childers Jacketing:

1. Best method of attaching jacketing is aluminum strapping and seals. Strapping can be pulled plenty tight with pliers like this. Other method is to use sheet metal screws.

2. A two-man crew can apply jacketing fastest. No special shop work or roll forming is necessary. Only tools needed are a pliers and a screw-driver or wooden wedge.



Each roll of Childers Jacketing comes individually packed like this in a heavy corrugated carton. Rolls are 4 ft. wide. With moisture barrier attached they are 100 ft. long; without moisture barrier they are 200 ft. long. They are well protected for field storage if kept dry. Individual boxes are light enough for one man to handle. (Adv.)